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ABSTRACT

The Pennsylvania School Improvement Program (PSIP) was created to assist local schools and school districts in the development of curriculum improvement strategies. The process involves the use of "linkers," curriculum specialists who work with teams from the local level to ascertain needs, then connect the local teams with the research and development agencies that can provide information and resources to help meet those needs. This document describes one rural elementary school's experience using PSIP in an effort to improve its mathematics program. During the period from late 1977 through May, 1979, the school went through the program orientation and needs assessment phases of the PSIP process. Materials used in these activities are included in appendixes. (Author/PGD)

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SCHOOL SITE CASE STUDY

School R

This report was prepared as part of the Research and Development Utilization Program for:

National Institute of Education
1200 19th Street, NW
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Bureau of Research and Evaluation
Office of Research, Planning and Data Management
Pennsylvania Department of Education

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PENNSYLVANIA SCHOOL IMPROVEMENT PROGRAM

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Bureau of Research and Evaluation
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AUG 4 1980

PENNSYLVANIA SCHOOL IMPROVEMENT PROGRAM

SITE CASE STUDY FOR SCHOOL R

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June 12, 1979

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SITE CASE STUDY

PART I

THE CONTEXT

PART I. CONTEXT

A. The Project

The Pennsylvania School Improvement Project: Objectives, Structure, Resources, Strategies and Major Activities

Objectives

The Pennsylvania School Improvement Program (PSIP) links the Pennsylvania Department of Education, Northwest Tri-County and Colonial Northampton Intermediate Units, and research and development agencies with ten pilot school districts to provide assistance in improving basic skills instructional programs. The research agencies are: (1) Research for Better Schools, (2) Research and Information Services for Education and (3) The Learning Research and Development Center of the University of Pittsburgh.

PSIP's objectives are, first, to help schools analyze their needs in the basic skills area and second, to help schools improve student performance in basic skills using the best available instructional programs and techniques produced by research and development activities.

Structure and Resources

The basic structure of PSIP is built upon the concept of an Intermediate Unit Linkage person serving as an educational entension agent who facilitates two-way communication between a local school and sources of R & D outcomes/products. This Linker is supported by a team of persons from the R & D agencies that provides technical assistance to a school site through the Linker. This team is called, for PSIP purposes, a School Assistance Team (SAT). The SAT always includes staff members from one or more of the participating agencies, a person with expertise in the content area of interest to the school site and the IU Linker. The SAT works cooperatively with a Local Action Team (LAT) and selected by the site school to analyze both student and program needs and then to select and to implement an R & D outcome appropriate to these needs.

The Pennsylvania Department of Education is responsible for managing and directing PSIP activities. The participating agencies are described in the following paragraphs.

The Learning Research and Development Center (LRDC). -- The mission of the LRDC, part of the University of Pittsburg, is to develop, study and evaluate adaptative educational environments for schools. LRDC has had experience in instructional design, curriculum analysis, policy analysis, teacher education and computer application in education.

Research for Better Schools (RBS). -- RBS is a private nonprofit educational laboratory established in 1966. Its mission is (1) to research and develop instructional systems and materials to improve educational processes for preschool through adult programs and (2) to assist regional education agencies in preparing and carrying out changes in the educational program.

Research and Information Services for Education (RISE). -- RISE operates under the primary sponsorship of the Montgomery County Intermediate Unit in cooperation with the Pennsylvania Department of Education. RISE has broad experience in disseminating information on curriculum research drawn from local, state and national resources.

The Intermediate Units (IUs). -- The State's IUs provide consultative, advisory and program services to local schools. An IU coordinator serves as a full-time Linkage agent to provide assistance to schools involved in PSIP activities.

Strategies and Activities

There are four major strategies in the PSIP process, (1) Needs Assessment, (2) Knowledge Consolidation, (3) Selection and (4) Implementation. Each of the major processes incorporates planned and structured LAT/SAT workshop-type activities as well as follow-up assistance by the IU Linkage person to supplement each major workshop. These sequential interrelated processes will result in an upgrading of the LAT's skill in the use of needs analysis techniques to improve instruction, in the documentation of priority areas for improving the basic skills program and in SAT technical assistance to the LAT in reviewing and selecting available options and implementing educational changes.

Needs Assessment. -- Needs assessment is the first phase of school participation. The LAT works cooperatively with the SAT in a problem-solving process to analyze student needs and program needs. There are three major activities involved in needs assessment. Each major activity requires formal LAT/SAT workshop sessions coordinated by the Linker. The three major activities are described below.

ORGANIZING THE NEEDS ANALYSIS. -- This meeting provides the Local Action Team (LAT) with an overview of the needs analysis and focuses on a general area of need for later concentration. The major objectives are to orient the LAT to the entire needs analysis process and to help the group begin to function as an effective problem solving team and to develop a general statement of the school needs on the basis of a review of school data.

The Research Utilizing Problem-Solving (RUPS) materials are used during this activity. The outcome of the session is the appointment of an LAT coordinator and a general problem statement for the school.

ANALYZING STUDENT NEEDS. -- These sessions are designed to identify the discrepancy between desired student performance and current student performance and to prepare a detailed statement of student needs on the basis of that discrepancy. The structured sessions are based on Curriculum and Instruction: Planning Improvement, a handbook developed by RBS. The outcomes of the student needs analysis sessions are: (1) a chart showing desired student performance in a basic skill area, standards for this performance and a description of the target population (2) a chart showing current student performance in these areas, (3) a discrepancy analysis of these charts and (4) a detailed statement of student needs.

ANALYZING PROGRAM NEEDS. -- The purpose of this phase is to identify aspects of the current educational program which might be strengthened in order to imorove student performance in the defined need area. The materials used for program analysis are: a model of classroom processes developed by research at LRDC, instrumentation based on the variables from this model, and data from other needs analyses activities.

During the program analysis sessions the LAT is provided with an overview of the factors which R & D suggest relate to student performance. The LAT then decides which of these variables should be investigated. Instruments are constructed and data are collected by the LAT and the Linker. The SAT analyzes the data and submits a summary of the findings to the LAT for consideration in producing a statement of program needs.

Knowledge Consolidation. -- This phase consists of an Outcome Search and a comprehensive Literature Search on what research and development says about (1) basic skills learning and instructional theory and gereral learning theory, (2) principles of diffusion and dissemination activities, and (3) school organization and curriculum development processes. The Outcome Search identifies effective educational practices in basic skills instruction, screens the educational practices for validity and availability and analyzes them using criteria developed by the LAT during the needs definition phase. A bank of appropriate, usable alternative practices for basic skills instruction is then submitted to the LAT for consideration.

The Knowledge Consolidation activities are initiated as soon as the LAT generates a general problem statement at the first needs assessment session. Data is entered into Knowledge Consolidation as it is generated by the LAT.

The Selection Process. -- During the selection process the LAT develops selection criteria related to local school conditions, screens possible educational practices using these standards, selects the practice that best meets the standards and produces a general plan for implementing the educational practice selected. During this activity the LAT is first presented with a set of R & D outcomes selected by the Knowledge Consolidation component using the data generated by the student needs analysis and the program analysis activities. These R & D alternatives are reviewed and screened by the LAT using site-specific criteria. There are two or three elimination rounds to the process. The outcome is the selection of some R & D product/process for implementation.

The Implementation Process. -- The LAT and the SAT work together to develop a realistic plan for implenenting a change in the school curriculum. Staff members are trained, and the new instructional process becomes operational. The SAT provides technical assistance to the LAT in evaluating the effectiveness of the new procedures and assists in modifications when necessary.

B. The Site

General Background of PSIP School R

PSIP School R is a K-6 elementary school located in a predomiantly Caucasian-Protestant district in mid-eastern Pennsylvania. While the district represents a rural setting, it boarders on a popular vacation resort center. This provides the district with a network of highways leading to several metropolitan areas.

The socio-economic make-up of the community tends to be skewed toward the upper and lower extremes. A majority of the residents are employed in farming and as labors in the textile and other light industries of the region. A second grouping of residents are professionals who commute to the neighboring metropolitan areas. Presently, the community is struggling with declining physical and economic conditions including limited employment opportunities and population loss.

The school district contains six building; four elementary, one junior high, and one senior high school. PSIP School R is the newest and largest elementary building in the school district. The building has been in operation for nine years and has the K-6 students population of 620. This enrollment represents a decrease by 150 students during the last five years. The present enrollment is expected to level off and remain stable at this point.

A factor of some concern within the school district has been the number of changes in the district level leadership. In the past five years, previous to PSIP involvement, five individuals have occupied the position of district superintendent. When the district entered PSIP, Mr. P assumed the position of acting superintendent. He had previously held the position of assistant superintendent and was initially responsible for PSIP involvement at School R.

Mr. F has served as building principal at School R for the past five years and previously taught intermediate grades in another district of Pennsylvania. He serves on a twelve month contract. He does not have any adminstrative assistance. He describes the district organizational climate as open, but in need of some real direction. "I have been here (the district) for five years and I rank second in senority in the district administrative team." Because of this, he feels he has a great deal of autonomy which he views as an advantage.

> "When I came here many things were going on internally. Most of these have been resolved. There has been a big turnover in our building staff, about fifty percent, since I came here. Teachers were relocated to other buildings. Many teachers did not work well together. They were not given a great deal of responsability for selection of materials.

Presently, he describes teacher moral as generally good and reports good support from the central administration.

The principal and staff describe the community residents as conservative. There is little pressure for educational change. Parents have a low educational expectation for their children. There are a core of interested parents and some volunteers at School R. However, the majority of the parents do not view school involvement as a part of their community role.

PSIP School R has a professional staff of thirty-five, twenty-five of whom are classroom teachers. The teaching staff of this school has been predominately female. There are twenty-seven female and eight male teachers with an average teaching experience of eight years. The majority of the staff have spent most of their lives in within the local area.

The length of the teacher day at School R is 7 1/2 hours. Teachers spend 200 minutes daily in actual instruction with a 45 minute planning period. The students have a 6 1/2 hour day. The average class size is 26 students. There are two employed aides, four volunteer aides, and twenty livrary volunteers. Some teachers do have student teachers during the year.

PSIP School R was initially identified as a target school on the basis of the school's scores on the 1976 Educational Quality Assessment (EQA) measures of basic skills. EQA is the Pennsylvania State Assessment program and actual school scores are compared with a predicted range of scores for that school. PSIP School R scored below the predicted range of scores in both verbal and mathematics measures of the EQA battery. The major area of concern was mathematics since the reading scores based upon the SRA Achievement Test had shown improvement over the last few years. EQA test results from 1976, standardized achievement test scores, and teacher opinionaires all pointed toward the selection of mathematics as the target area. When approached about the PSIP effort, both the acting district superintendent and the school principal agreed to the school's participation and identified the problem area to be addressed.

School Math Program at Entry

Description--School R was using Holt-Rinehart-Winston series across all grade levels. This series had been in use for the past ten years. Historically, there seemed to be a district wide control of curriculum. The majority of the present staff at School R had not been involved in the selection of this text series and were generally unstaisfied with the instructional tool. Teachers indicated there exists a math curriculum guide which they describe as merely a reference guide of games and skills. The teachers followed the text closely. Math instruction was primarily teacher directed whole class instruction.

Teacher Perception of Math Program--Five classroom teachers and the librarian at School R were interviewed. Their involvement at the site ranged from two years to nine years. Several problem areas for improvement were identified. Major concers focused on identifying individual student needs in math and improving small group instruction that would neet these identified needs. None of the teachers interveiwed indicated they were presently grouping students according to ability level. They were concerned with the additional planning time that would by required for grouping. All teachers expressed a need for more materials to provide reinforcement and enrichment in math. All respondents felt there felt there was a need for a formal curriculum to follow that would provide some coordination between grade levels.

The problem area of math had been identified by teachers and the building principal through daily observation and classroom experiences. Test data from the SRA Achievement Test and from the Educational Quality Assessment program supported the validity of the problem. Respondents indicated that the math problem had existed for a period of years, but little had been done to resolve it. Recently, Reading had recieved a higher priority in the district in terms of time and money assigned.

The teachers agreed the type of help most needed was a plan of attack, the opportunity to examine methods, and the aid of a curriculum specialist to coordinate their efforts. Respondents felt that help was most needed in improving group planning and decision-making, involving more people in the problem-sloving process, and setting up a good feedback system. Getting information about innovations and securing more staff support were also areas of needed help. Most areas that require money were identified as areas where help was needed. Respondents condidered the most important condition necessary for change was the strong belief and committment by a significant portion of the staff and the community that something needs to be done.

SITE CASE STUDY

PART II

PSIP ACTIVITIES AT SCHOOL R

A. Entry/Initiation Phase

There are three major activities during the PSIP Entry/Initiation Phase. First, a general overview meeting of the central office administrative teams from all participating school districts is held at the intermediate unit office. An orientation session is then presented by the PSIP team at the school site for the entire faculty. The site orientation session is followed by an on-site visit by the PSIP School Assistance Team (SAT) to gather information about the general climate of each school. This on-site visit is called a Pulse Session and the SAT virtually does "take the pulse" of the school.

General Overview Meeting

The building principal from PSIP School R and the district superintendent attended a general overview meeting held at the intermediate unit (IU). At this meeting, a general overview of PSIP was presented to allow the school district administrative teams to consider all of the ramifications of PSIP participation. The school districts and the schools within each district had been identified as possible PSIP sites through state assessment data in the basic skills areas (Math/Reading) and on the basis of a history of cooperation in IU activities in the past. District administrators were given a brief summary of the kinds of information generated by PSIP process and possible pay-off of the school. At the conclusion of the first general overview session, School R agreed to participate in PSIP.

On-Site Orientation Session

The general overview session was followed on December 14, 1977 by an On-Site Orientation Session at School R for the total faculty. This on-site orientation was presented by the IU assistant executive director and the IU Linker. The IU assistant executive director explained the IU's role in PSIP. The Linker presented a general outline of PSIP. She described the goals of the project, the role of the research agencies, and the activities involved in the project. The LAT and SAT roles were defined. The pay-off of instructional improvement was stressed.

Linker Follow-up--Pre-Pulse Visit

Following the general overview, the IU Linker was in contact with Mr. F, the building principal, to answer any questions and plan for the SAT on-site visit. Mr. F anticipated having School R's existing curriculum committee move in as the LAT. He indicated his desire to serve as the LAT coordinator. The LAT consisted of Mr. F, the principal; Mr. R, grade four teacher; Ms. M, grade three teacher; Ms. S, grade five teacher, Ms. K, grade 6 teacher; Ms. B, grade two teacher; and one alternating member K-6 teacher. Background on the LAT is provided in Appendix A. Mr. F and the Linker worked closely together to arrange for the next major PSIP activity.

The Pulse Visit was scheduled for January 25, 1978. The SAT team, made up of the IU Linker, the PSIP evaluator, a representative from LRDC with background as a school administrator, two representatives from RBS with expertise in Mathematics, and the PSIP case study writer met on January 24, 1979 to review the background data on the school site and interview/observation techniques that would provide a common frame of reference for the total team. A set of questions were developed relative to a specific set of constructs abstracted from the Cooley-Lohnes Model of Classroom Processes and can be found in Appendix A-2. The SAT members planned to interview the members of the staff during free periods and observe mathematics classes during the pulse visit. The pulse session visit was post-poned due to a winter ice storm resulting in the school closing on the day of the scheduled visit.

The Pulse Session

The Pulse Visit was re-scheduled for February 1, 1978. This site activity involving classroom observations and interviews with teachers and the principal was planned and carried out by the IU Linker, Linker associate, IU assistant executive director, two RBS staff persons, and PSIP case study writer. The information collected was summarized by the IU Linker for use at the next session.

Summary of Pulse Visit Impressions

The school atmosphere was pleasant. Student activities and discipline seemed well organized. The principal appeared to be very enthusiastic about developing good learning opportunities. The teachers descrived their students as well disciplined, but lacking many life experiences which contribute to a low level of student motivation for learning. The staff expressed a desire for more parental involvement in the school.

The average class size observed was found to be twenty three students and averaged forty minutes in length. Although the teachers interviewed felt their training in the area of math and the classroom time allotted to student instruction adaquate, they were concerned that there was not enough time to plan for small group instruction.

Since most mathematics instruction was directed to the whole class, there was little evidence of provisions made for individual differences in ability. Teachers expressed a need for more materials to provide reinforcement and enrichment.

It was also agreed by the teachers interviewed that the present text being used, Holt-Rinehart-Winston, was not considered to be an adequate instrument in their respective classrooms. It was felt that the concepts, as they were presented, were too abstract. It was also indicated that this particular text was deficient in the area of instructional activities, both as follow-up activities and instructional materials.

Teachers interiewed felt that the present method of selection of texts and instructional materials was not adequate. These teachers felt that there was a need for more teacher input in order to make decisions about materials to be ordered. At present, a committee system is in use, but it was felt that this was inadequate and more teachers should be involved in the decisions.

A discrepancy existed across grade levels as to what should be taught. Teachers indicated that there does not exist an established curriculum which they can use as a guide. There exists a manual which consists of suggested activities and sequence of skills. Teachers felt there should be a formal math curriculum to follow so that coordination between grade level teachers could be better facilitated. It was also reported that there was little time for teachers to meet and share ideas. There was a need for more communication among and between grade levels in an effort to strengthen the program.

The mathematics program at School R, limited to the basal series, did not provide student diagnostic data. Student data from the SRA Assessment Survy, used for achievement testing at the school site, IQ test scores, and information from the Educational Quality Assessment (EQA) were supplied to the Linker as part of the Pulse Visit. The test data and Pulse Visit Report were presented to the LAT at the first formal Needs Assessment Session.

B. Needs Identification Phase

There are three major activities in the Needs Identification Phase of PSIP: (1) Introduction to Needs Identification, (2) Student Needs Analysis and (3) Program Analysis. Each major activity has a specific payoff that relates to the PSIP Knowledge Consolidation and PSIP Selection of Outcomes processes. The Introduction to Needs Analysis provides a general statement of a specific problem area; this problem statement provides the PSIP agencies involved in the Knowledge Consolidation processes with data necessary to initiate a definition of criteria relative to the site's specific area of concern. The Student Needs Analysis activities result in a detailed definition of the areas of need for a specific student population within a basic skills curriculum. Again, the Knowledge Consolidation unit uses this Student Needs Definition to further refine the pool of possible R&D outcomes applicable to the problem identified by the site. The Program Analysis provides an indepth description of the current school curricula in a selected skills area. This detailed description also contributes to the criteria used by the Knowledge Consolidation component to identify an appropriate listing or catalog of R&D outcomes to be submitted to the LAT during the Selection phase of PSIP.

Introduction to Needs Analysis

The first major PSIP activity scheduled for the LAT from School R was a formal workshop-type session that had been developed by RBS for the project. The Introduction to Needs Analysis took place at the intermediate unit building on April 26, 1978. Substitute teachers were provided for those members of the LAT who are classroom teachers (a total of five at this session). The Linker provided the leadership during this session with assistance from the PSIP director, an RBS person, an LRDC person, and a PDE staff person.

The planned agenda for Introduction to Needs Analysis provided an overview of PSIP objectives, a review of the Needs Analysis activities that would take place, and the reporting of school data from EQA (Pennsylvania State Assessment Program), from the school's testing program, and from the SAT's Pulse Visit.

The Linker was responsable for providing the general overview and the summary of the Pulse Visit. The LAT discussed and reacted to the report and in general agreed with the needs cited. Mr. F, the principal, expressed that primary motivation for his school's participation in the PSIP process was that it would give the LAT members the time necessary to examine their math program in depth to ascertain whether changes or modifications are necessary. He pointed out that it was almost impossible to do this properly within the school environment. He explained that trying to do justice to a curriculum evaluation after school when the teachers were tired and distracted was too difficult. All of the LAT members agreed it would be more meaningful and productive to work within the structured framework which PSIP provided.

The SAT provided the LAT with an analysis of School R's EQA and SRA test data. Mr. G, the PDE staff person, presented a general overview of EQA. He pointed out that when a school's EQA results are compared to those of schools with similar characteristics such as socioeconomic status, school size, and geographic location, then a direct comparison can yield some valid conclusions. Mr. G provided the LAT with a handout listing School R's 1976 EQA results. (Appendix B-1) This handout included the numerical score, the percentile achieved as compared to other schools in the state with similar variables, and a predicted range which represented a score span typical of those schools to which School R was compared. It was noted that in terms of math, School R fell considerably below the predicted range.

An item analysis of the questions missed on the math area by the students of School R revealed that many of the errors involved the concept of fractions. It was observed by several members of the LAT that typically fractions were taught toward the end of the school year and that very little instruction had been given.

SAT members stressed the value of examining the data in order to identify the school's area of need. LAT members responded, "It really gets you thinking about why these things are happening." "Perhaps we should look at the overall structure of our math program." Mr. F, the principal commented, "We will get a real awareness of what we are teaching through PSIP."

Following the presentation of the school data, the LAT members participated in a communication activity based on the RUPS process. This activity was helpful in developing the communication skills within the LAT and provided a model and strategy the LAT could use in writing their own problem statement.

The LAT members broke into two groups of three member each for the purpose of writing a General Problem Statement which would establish: what the problem was, who was affected and the goal for improvement. Members of each group were asked to work together to come up with one General Problem Statement for School R.

The activities of this day's session were concluded when the Problem Statements of both groups were read to the entire LAT. It was expected that the Linker would work with the LAT to consolidate the two statements into one General Problem Statement for School R. This was completed at a later date and can be found in Appendix B-2.

In summary, the LAT appeared to be highly motivated toward working through the PSIP process. The time and opportunity PSIP afforded the LAT members to examine their math program was seen as a major pay off. They felt the activities they has participated in were of real value. One LAT member said she felt that the writing of individual needs statements and later working on a group statement was an excellent means to insure everyone's imput. Other comments from LAT members concerning the value of working through the process ecercises were: "I enjoyed working with my cohorts which I normally wouldn't get the opportunity to work with." "We got a chance to feel each other's philosophy out." Another comment, "It sets some patterns for us in how much work will be involved in the process and brings the point across about how long it may take."

The Linker stressed to the LAT that PSIP is a long range project and that they should attempt to focus on one need, not try to do everything the first time through. The principal stated that if nothing else resulted from PSIP than the awareness session, he would be satisfied. A final statement from another LAT member, "Based on my experiences on committees set up on the school level, it takes some time to accomplish anything worthwhile."

Student Needs Analysis

The first Student Needs Analysis activities for School R took place at the intermediate unit office on May 23, 1978. An additional member was added to the LAT as a substitute member for this session, Ms. M, a high school math teacher for the district. The SAT consisted of the PSIP director, PSIP evaluator, two RBS persons and one PDE person.

Time was given for the LAT members to review their General Needs Statements, which had been written during the previous session, to compare and contrast the two statements and to determine if any changes or modifications were desired. The LAT decided they would revise their goals at another time in the near future.

The two RBS persons led the LAT in developing student needs analyses charts. These charts were to be based on the needs and goals determined by the LAT. The RBS person assisted the LAT in identifying content areas and student behaviors to be assessed. The LAT identified measures to be used for assessment.

The principal measure was the SRA Assessment Survey used in the 1977 achievement testing at School R. Desired standards for student success were set. The desired student standards were determined according to IQ breakdown. Before the LAT could begin to work on the charts, the following decisions were made:

1. The 1977 SRA Achievement Test results would be used.
2. Charts would be developed for grades three, four and five.
3. Goals, desired student standards, would be determined according to IQ breakdown. High IQ students would score in the 7th decile or above. Average IQ students would score in the 4th decile or above. Low IQ students would score in the 2nd decile or above.
4. 110 or above will constitute high IQ, 90 to 109 will constitute average IQ, 89 or less will constitute low IQ.

It was decided that the LAT would work individually by grade and determine what skills were not presently being taught at School R. The LAT worked as a total group to complete the performance chart for grade three. This chart is found in Appendix B-3. The LAT agreed to complete the remaining charts before the next session.

Following the first needs session, the process came to a halt. The principal, serving as the LAT coordinator, had assumed the leadership of the LAT. He had been given the support of all of the LAT members, but his role as both process leader and administrator became very demanding of his time. The Linker had assumed a passive management style. Additional interaction and assistance were needed in order to complete the student performance charts. The Linker reported contacting the principal to check on the LAT progress, but there was no other direct support offered. Had the Linker become more visible through more frequent telephone calls and personal visits to the site school, the LAT may have been able to move through the needs activities on a more realistic time line. As it turned out, eight months lapsed before the next session was scheduled.

A second full day LAT/SAT session was held on January 17, 1979 to analyze the discrepancies between desired and current levels of student achievement. The discrepancy analysis activities are usually scheduled for a full day session close in time to the completion of the student performance charts. As mentioned before, the LAT had been unable to complete these charts untill the 1978-79 school year. At this time the LAT decided to generate new data for the effective areas using more recent 1978 SRA test scores. The new data was used to determine current student achievement levels of performance in mathematics.

The LAT had worked on their own to analyze the current student scores from the 1978 SRA Assessment Survey and determine what percentage of students in each of the three identified ability groups met the criterion set. Discrepancy between the desired and current standards had been tabulated. The results of this analysis for grade five students at School R can be found in Appendix B-4.

After a review of the discrepancy analysis, the LAT coordinator questioned its validity. He was concerned with the fact that on certain subscales, the limited number of item made an accurate interpretation of decile scores impossible.

Mr. G, from the PDE advised the LAT in this matter. He pointed out that the use of grade equivalent scores would have been superior to the use of decile scores in setting standards. Suggestion was made that the LAT might avoid the use of the norm referencing of the test, examine actual test items and set a criterion-referenced standard in terms of percentage of students expected to answer items correctly. Another option offered was the use of teacher constructed criterion-referenced tests. Mr. G pointed out to the LAT that standardized, norm-referenced tests are only indicators, not diagnostic, and that their existing analysis based on decile scores in discret areas of the SRA Test, painted an unrealistic picture of how students are doing in these areas.

At this point, the Linker asked the LAT to make a decision concerning their intended use of the present discrepancy analysis. After some discussion, the consensus was that the analysis was acceptable as an indicator since it was intended to be a part, not all of the basis for decision making by the LAT. A decision was made not to redo the discrepancy analysis procedure but to continue with the task of defining students needs based upon the information available.

The Linker asked the LAT to refer back to the discrepancy analysis information to determine the area of greatest need. The LAT worked in three small groups to determine priority need areas for the three ability levels. Following the small group work, the results were posted and considered by the LAT as a whole. Results are found in Appendix B-5. The priority areas identified were accepted by the LAT.

Time was given for the LAT to begin the task on writing a detailed statement of student needs for the school. Some work was completed by individuals on the LAT. However, during lunch break, inclement weather conditions resulted in the early closing of the site school. The meeting was adjourned early with plans for the LAT to meet on their own to complete the Detailed Student Needs Statement.

Throughout the needs activities, individual members of the LAT, with the exception of the principal, maintained a low profile. Although the team members exhibted positive attitudes toward the process activities, they were motivated by the enthusiam and leadership of Mr. F. It was obvious that Mr. F had selected the LAT members based on past cooperation and involvement with the site school. Mr. F had described the majority of his staff at School R:

> "They are good teachers who would do anything for you, but they must be lead. They are like sheep."

Mr. F had a proffessional motive for PSIP involvement. He expected PSIP to serve as a catalyst for the district. His professional motive was augmented by a proposed salary increase for himself, based on the degree of improvement of student math achievement scores at School R. Mr. F did not view staff involvement in decision making as a central issue. He was convinced that once the goals and plan for math improvement were defined, they would be readily accepted by the staff, community, and central administration and that none of these would undermine or hamper the process.

Program Needs Analysis

Past experience of having the LAT work on their own time to complete PSIP activities had not been too successful. Realizing the need for another LAT working day to complete the Needs Statement, the Linker scheduled a third Needs Assessment Session for February 12, 1979. This session also included the introduction to Program Analysis activities.

The Linker provided the leadership for this session. There were no SAT members present. Two additional members were added to the LAT. Ms. D, a newly assigned sixth grade teacher at School R replaced Ms. K. Ms. K had been reassigned to another elementary school in the district. The principal explained that funds had been allocated to include first and second grade in budgeting for math materials and that he felt Ms. H, the first grade teacher should be included on the LAT.

The LAT members, working in two groups, completed two Needs Statements. After comparing the statements, the LAT agreed that both were similar and contained ideas of value and that both should be included for future reference. These statements are found in Appendix B-6. The LAT decided that the Needs Statement of group 1 would be their formal Detailed Needs Statement for School R.

At this time, Mr. F stressed that the economics issue must be kept in mind when examining goals for math improvement. He expected a tighting of the school budget and asked the LAT to consider goals that could be met with little additional cost. His concern suggested that a lack of financial resources would influence final selection. Mr. F continued to lend support to the process. and to reassure the LAT members of the value of their efforts. He commented on his satisfaction with the process and his increased awareness of the value of active listening since his involvement with PSIP.

> "We have said things here that the teachers may have been saying to each other all along, but I wasn't aware of them. Some of this process has been more valuable or enlightening for me than for the teachers."

The day's session continued with the Linker introducing Program Analysis activities and the Cooley-Lohnes model of classroom processes on which Program Analyses is based. The LAT decided to analyze their math program relative to the 13 variables that relate to student achievement. These variables are provided in Appendix C-1.

Possible data collection procedures were discussed: structured interviews, questionnaires, classroom observation, and curriculum analysis. The LAT decided on the use of both teacher and administrator questionnaires and classroom observations. Time was given for the LAT to examine sample questionnaires, review the questions already outlined for each variable, and ass or delete any questions they felt were appropriate or inappropriate.

The Linker worked with the LAT to develop a draft of both the teacher and administrator questionnaire used for data collection. At the end of the day, these questionnaires had been developed, but additional time was needed to discuss the form to be used for classroom observations. Plans were made to continue this at the next session.

On March 13, 1979 an additional full day planning session for Program Analysis was held at the intermediate unit office. The total LAT attended this session. The Linker provided the leadership. There were no SAT members present at this session.

Data collection instruments were reviewed and further developed. The Linker and LAT members discussed strategies that would be used to administer the instruments and agreed upon the time schedule required. Program Analysis instruments used for School R are found in Appendis C-2.

These instruments were used during two full days of on-site data collection conducted by the Linker and her assistant. The Linker and assitant were responsible for analyzing and summarizing the data.

A third Program Analysis meeting was held at the intermediate unit office on May 30, 1979. The purpose of this meeting was to present to the LAT the results of the questionnaires and classroom observations conducted at School R. The Linker presented the summaries of the data organized by classroom variables according to the Cooley Lohnes Model. This Program Analysis Report is found in Appendix C-3.

The presentation of each variable and the summarized data was followed by LAT discussion. The Linker asked each LAT member to write summary statements that would describe their conclusions concerning program needs. It was expected that these statements would be used to identify specific problems for which solutions would be sought. Although this session provided the LAT with an extensive awareness of the existing math program at School R, the LAT as a group did not have time to agree on a program synthesis. The LAT agreed to meet with the Linker on June 21, 1979 to finalize their program needs definition based on the data presented.

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APPENDIX A

BACKGROUND DATA

Appendix A-1

LAT Background

Mr. F, the LAT coordinator, has served in the district for the past six years as building principal at School R. Previous to his principalship, Mr. F served as an elementary teaching in another school district. He received a BA from Bloomsburg State College and a MEd from Bucknell University. Mr. F has had experience on various teams and committees to analyze and seek solutions to school problems: Milton Project (Ford Roundation), Report Card Revision Committees in two school districts, Kindergarten Entry Committee, Curriculum Committees, and others.

Ms. H is a first grade teacher at School R. She has a total of ten years teaching experience, six in the site district. Previous to the first grade teaching assignment, she taught kindergarten for four years in another elementary building in the district. This is her first year at School R. Ms. H has earned her BS in Education and a Masters Equivalent. She has served on the committees for kindergarten and first grade Minimal Skills Test and the Report Card Revision.

Ms. B, a second grade teacher at School X, earned her BS from Bloomsburg State College and a MED from East Stroudsburg State College. She has taught a total of eight years at the site school and has been involved in the following committee work: Long Range Planning, Report Card Revision, and Transitional Grade Committee.

Ms. M earned her BS from East Stroudsburg and has served as a third grade teacher at School R for five years. She took part in the Report Card Revision and Transitional Grade committees.

Mr. R has a total of twelve years teaching experience, seven at School R and the remaining five in another elementary school in the district. He earned his BS from Shippensburg State College and additional graduate credits from Penn State.

Ms. S is presently teaching all fifthe grade math at School X. She has a total of ten years teaching experience, all of which has been at the site school. She earned a BS and MEd from East Stroudsburg State College.

Ms. D is the sixth grade teacher serving on the LAT. She has six years teaching ecperience at the site school and has earned a BS in Elementary Education.

Appendix A-2

PSIP

Pulse Visit

Teacher

1. How many years have you been teaching?

    ____ years

    ____ In this school

    ____ In this district

2. What is your certification ?

3. What degrees have you earned?

4. Have you had any courses dealing with specific problems of the elementary school?

    Administration

    Discipline

    Curriculum

5. How would you rate your training in teaching of mathematics?

    1 2 3 4 5

    Low High

6. Are you reasonably satisfied with the students' overall achievement at the end of the elementary years? With the students' math achievement?

7. What aspects of the program do you feel need strengthening?
    - a. Teaching strategies known and used
    - b. Scheduling procedures
    - c. Discipline procedures
    - d. Selection and purchase of instructional materials
    - e. Parent involvement
    - f. Greater coordination of effort within and beyond the elementary school

8. Are you observed or evaluated on a regular basis? Do you receive feedback from these observations/evaluations?

9. Is there a basic math curriculum? With specific objectives?

10. How is the math achievement of your students measured? Is it an adequate and fair measure?

11. How were you involved in the development of the present curriculum?

12. Basically how would you describe the student body?
    - a. Well disciplined
    - b. Highly motivated
    - c. Subject to parental pressure

13. What is your teaching load?

Daily classroom time ______________ Class size ___________

Other responsibilities ________________________________

Planning Period ______________________________________

Math class minutes per day ____________________________

Appendix A-2 continued

14. Is the school organized in any way?

Primary grades, Intermediate grades ____________________

Regular meetings ____

Are there prepared agendas for the meetings? __________

15. What is your basic math text? ______________________________

a. Do you find it satisfactory? If not, why?

b. Is it suitable for all students?

c. Do they like it and find it motivating?

16. What supplementary materials are available for your use?

a. Are they applicale?

b. Is there a sufficient quantity?

17. Do you group your students for math? Describe how you group.

18. Do you have any parent or aide assistance in your math class?

19. Do you give math homework? Do parents help students with their homework? Do they have the knowledge necessary?

20. Do you have much contact with parents? Under what circumstances?

21. What use do you make of the standardized test results?

22. Do you often request the services of the guidance department or other specialists? If so, under what circumstances?

23. Have you been involved in any special or innovative programs?

24. How can a project such as PSIP be of greatest assistance to you as a teacher? school?

Appendix A-2 continued

25. How do you deal with individual differences?

26. Do you think enough time has been scheduled to adequately teach your math objectives?

27. Do you have any questions about PSIP?

Appendix A-2 continued

PSIP

Pulse Visit

Principal's Interview

1. How many years have you been a principal? ______________

   In this building______________

   Where else?__________________

2. Teaching background? (subjects and experience)

3. Preparation? (certification and degrees)

4. Student enrollment?

   K. __________ 2. __________ 4. __________ 6.__________

   1. __________ 3. __________ 5. __________

5. Size of staff?

6. Average class size?

   Primary _______

   Intermediate ________

7. Scheduling practices?

   Length of day ________ students________ teachers _______

   Teacher classroom time per day __________

   preparation time ______________

8. Do you have a parent organization? How often are meetings scheduled? How are parents informed about school activities-local papers, newsletters?

9. Citizen involvement in planning?

10. Present or recent innovative programs?

11. Outside institutions involved?

    IU
    Title III or IVC
    Eric
    RISE
    Colleges or Universities

12. Do you have a Title I project?

13. How is staff organized? Department heads?

14. Are there regular staff meetings?

    frequency ________ nature ____________________________

    time of day _______

15. Does the district have in-service days? Act 80 days?

16. How are staff members evaluated? Classroom visitations?

17. Are lesson plans required?

    How often ____________

    Submitted to and read by ______________________________

18. Student behavior?

    code __________

    policies __________

19. Absenteeism?

_________%

20. Any administrative assistance?

21. Length of principal's year?

22. Budgetary procedures for building?

23. Purchasing procedures for building ?

24. Textbook selection? Any policies?

25. District wide administrative meetings? Policies?

PSIP

Pulse Visit

Counselor

1. How long have you been a counselor?

   In this district ________

   School ________

2. How many years were you a teacher?

   In this district ________

   School ________

   Subjects ________

3. What are your areas of certification?

   What degrees have you earned? ________

4. Method of operation?

   a. Group guidance _____ major _____ minor

   b. Individual guidance ______major ________minor

      (1) Scheduled

      (2) Referrals

5. How do you work with teachers?

   a. On call

   b. Planned meetings

   c. Consultant

6. What is the school's testing policy?

   a. Standardized achievement

   b. Aptitude

7. How are tests administered? Corrected?

8. How are the test results used?

    a. What information is provided students?

    b. What information is provided parents?

    c. What information is provided teachers?

9. What sort of information do you seek from students? How is it used? Recorded?

10. How are class sections determined?

11. What is the promotion-retention policy?

12. Are there any special education or remedial classes? How are students identified?

13. Do the students have any special interest opportunities?

14. Do you have an ectended school year?

15. Have you been involved in any special or innovative guidance programs?

16. What do you see as the major responsibilities of your position?

17. How do you think the following people see your role?

    Students

    Teachers

    Parents

    Principal

APPENDIX B

SCHOOL R DATA

STUDENT NEEDS ANALYSIS

Appendix B-1

A

1976 EQA
School R

1976 Testing		Medn. Score	%ile	Predicted Range
I	Self-Esteem	76	58	72 - 79
III-V	Verbal	below- 16.8	33	17.3 - 19.9
III-M	Math	below- 16.6	17	18.0 - 20.4
IV	Int. in School	52.8	67	47.6 - 54.8

		%ile	III-V	III-M	
Father's Occ.		58	.66	.59	correlations
Mother's Ed.		64	.57	.53	
Parental Att. Twd. School	Usual hang together-	41	.45	.44	
Home Climate		90-	.56	.51	

Correlation between Goal I and Goal III-V is .61 and III-M is .56.

Pretty close

Verbal	State	Local	Math items correct	State	Local
24-30	17%	14%	23-30	20%	6%-
20-23	21%	17%	20-22	21%	17%
16-19	23%	26%	17-19	22%	27%
13-15	17%	24%	14-16	19%	26%
0-12	22%	19%	0-13	18%	24%-

Health		Vocational Knowledge	
22%	21%	21%	25%
16%	19%	20%	19%
23%	27%	15%	23%
21%	19%	22%	17%
18%	14%	22%	17%

Appendix B-2

Local Action Team
Pennsylvania School Improvement Program
General Needs Statement

Needs Statement: Who is affected?

1. EQA and standardized tests indicate that our pupils could do better in mathematics.

2. Teacher, pupil, and community opinion regarding the math program are less than positive as reflected by the EQA and other informal evaluations.

What kind of need is it?

1. The district needs to examine student, teacher, and parental attitude toward math and expend a greater amount of time, energy, and resources in establishing our math priorities.

2. District and grade level goals must be established in conjunction with an assessment of materials and practices now in use.

Goals

1. Pupils will be expected to score within a predicted range on a standardized test based on diagnosed potential.

2. To generate a positive attitude toward math on the part of both school and community.

4th Grade

STUDENT NEEDS ASSESSMENT CHART

CONTENT AREA AND STUDENT BEHAVIORS	MEASURES OF STUDENT BEHAVIORS	DESIRED STANDARD FOR STUDENT SUCCESS	CURRENT STANDARD OF STUDENT SUCCESS
I. F. Measurement 1. Units of Time and their relationship; Abbreviations 2. Units of Money and their relationship; Symbols $ and ¢	SRA Achievement Series, Blue Level Concept Section Measurement Items	For the 17 4th grade students with IQs over 110. All 17 should score in the 8th, 9th or 10th decile for this cluster.	*Only 10 students scored in or above the 8th decile.* *Seven students scored in the 5th and 6th deciles.*
*3. Units of Length a. relations within a system b. estimates of common units c. abbreviations and symbols		For the 63 4th grade students with IQs 95 - 110. All 63 should score in the 4th,5th,6th, or 7th decile. for this cluster.	*Five of these students scored in the 8th decile.* *Fifty-five of these students scored in the 4th - 7th decile.* *Three of these students scored in the third decile.*
*4. Units of Weight a. relations within a system b. estimates of common units c. abbreviations and symbols		For the 10 4th grades students with IQs less than 95. All 10 may score in the 1st-3rd decile for this cluster.	*Two of these students scored in the 4th decile.* *Eight of these students scored in the 1st - 3rd decile.*

*metric and English

N=115

Ability Level: ~~[illegible]~~

Grade: 5 (1978)

This year's 1979

Teacher:

Student Name or Number	Concepts Numeration	Concepts Operations	Concepts Problem-Solving	Concepts Geometry	Concepts Measurement	Computation Whole +, -	Computation Whole x, ÷	Fractions +, -	Fractions x, ÷	Decimals and x	Maps and Charts
-LOW	252	80	75	90	65	70	60	40	20	40	85
	55	70	65	80	80	70	60	55	40	60	80
	-20	-10	-10	-10	+15			+15	+20	+20	
AVERAGE	70	52	56	67	67	74	70	59	33	74	89
	81	65	61	61	81	88	69	62	54	58	77
	+11	+13		-6	+14	+14				-16	-12
HIGH	53	29	47	24	29	47	24	24	35	41	65
	48	48	57	67	57	57	62	14	0	24	48
		+19	+10	+23	+28	+10	+38	-10	-35	-17	-17
TOTAL	66	54	59	60	54	66	51	41	29	52	80
	61	61	61	69	73	72	64	44	32	47	68
	0	+	0	+	+	+	+	0	0	0	=
Totals	64%	58%	60%	65%	64%	68%	58%	43%	31%	50%	74%
ile 1-3											
ile 4-6											
7-10											

Student ident' by IQ.
low - 89 less constitute I.Q.
Ave- 90 to 109

Ability Level: ____________ Grade: Current 5th (1979) last year's (1978) 4th gr. Teacher: ____________

Student Name or Number	Concepts Numeration	Concepts Operations	Concepts Problem-Solving	Concepts Geometry	Concepts Measurement	Computation Whole +, -	Computation Whole x, ÷	Fractions +, -	Fractions x, ÷	Decimals and %	Maps and Charts
LOW	50	37	75	75	75	100	88	50	0	75	50
AVERAGE	65	54	54	65	73	76	68	70	32	62	92
HIGH	74	52	57	91	74	74	65	17	39	39	61
TOTAL	63	48	62	62	74	83	74	46	24	54	68
Totals											
Decile 1-3											
Decile 4-6											
Decile 7-10											

Appendix B-5

Needs priorities as determined by Student Needs Analysis

High Ability Group	Average Ability Group	Low Ability Group
1. Fractions +, -	1. Concepts Operations	1. Concepts Numeration
2. Fractions X, ÷	2. Problem Solving	2. Concepts Operations
3. Problem Solving	3. Fractions	3. Problem Solving
4. Geometry	4. Decimals & Percent	4. Computation of Whole Numbers +, -, X, ÷
5. Concepts Operations (theory)	5. Concepts Geometry	
6. Decimals		

Detailed Student Needs Statement

Group 1

Who is affected?

Standardized tests indicate that our pupils in 4th, 5th, and 6th grades could do better in mathematics.

What are the needs?

1. Pupils in the high, average, and low ability groups could do better in the following areas of mathematics: problem solving, concept operations.

2. Pupils in the high and average ability groups could do better in the following areas of mathematics: fractions, decimals and percent, geometry.

3. Pupils in the low ability groups could do better in the following areas of mathematics: numeration (concepts) and computation of whole numbers (+, -, X, ÷).

What are the goals for improvement?

A higher percent of the pupils in each ability group will meet the standards for the high, average, or low groups.

2/12/79

Group 1 Statement - accepted by total LAT.

Detailed Student Needs Statement

Group 2

Who is affected?

Teachers, pupils, and community will be involved in developing and implementing a comprehensive program to meet the needs of each ability level.

What are the needs?

1. Greater emphasis needs to be placed on problem solving.
2. To clarify the theory to be taught at various grade levels.
3. To develop Programmed Tutoring for each ability group (inter-class).

What are the goals for improvement?

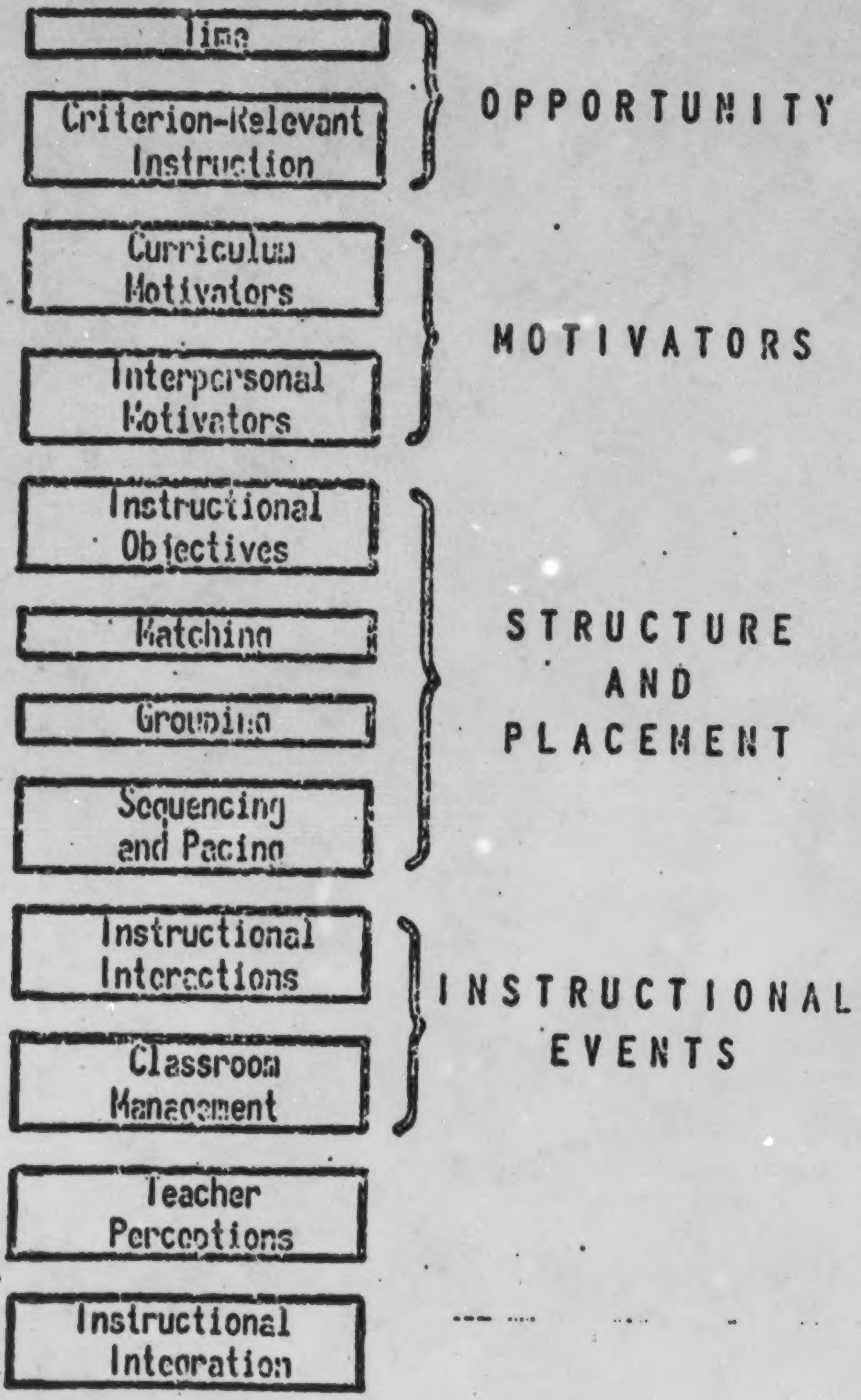
1. Continuing unit on problem solving as related to curriculum and practical application.
2. Through a possible restructuring of the math program, concept operations may be taught through ability grouping.
3. Materials bank for ability levels to be used with Programmed Tutoring.

APPENDIX C

SCHOOL R DATA

PROGRAM ANALYSIS

Appendix C-1


Time
Criterion-Relevant Instruction
OPPORTUNITY
Curriculum Motivators
Interpersonal Motivators
MOTIVATORS
Instructional Objectives
Matching
Grouping
Sequencing and Pacing
STRUCTURE AND PLACEMENT
Instructional Interactions
Classroom Management
INSTRUCTIONAL EVENTS
Teacher Perceptions
Instructional Integration

Pennsylvania School
Appendix C-2
Improvement Program

PROGRAM ANALYSIS

Mathematics

Teacher Form

__Directions__

1. *Complete the identifying information below. Do __not__ put your name on this questionnaire.*
2. *On the following pages, mark your answers according to the directions given in italics after each question.*

a. At what level do you teach math? Circle one.

Primary   Intermediate   Kindergarten   Transitional

b. Name of your school ______________________________

c. District name ______________________________

OPPORTUNITY

Items 1 - 19

1. With respect to the students assigned to your math class....

   a. Are they assigned so that the class has a somewhat uniform ability in math? *(Check one and follow the indicated direction.)*

      ______ A. Yes....*Answer the remaining part of this item.*

      ______ B. No.....*Skip the remaining part of this item.*

   b. If the students in your class have somewhat uniform abilities, what is their ability level? *(Check one.)*

      ______ A. High ability

      ______ B. Average ability

      ______ C. Low ability

2. How many students are presently enrolled in your math class? *(Write the number in the blank space.)*............ ______

3. How many students are actually present today in your math class? *(Write the number in the blank space.)*......... ______

4. Is today's attendance in math class typical? *(Check one.)*

   ______ A. Yes

   ______ B. No, usually more students are present

   ______ C. No, usually fewer students are present

5. During an average week, how often is math instruction interrupted by fire drills, assemblies, hallway noise, and so on? *(Check one.)*

   ______ A. Never

   ______ B. Less than once a week

   ______ C. 1 or 2 times a week

   ______ D. 3 or 4 times a week

   ______ E. 5 or more times a week

Appendix C-2 continued

6. How much time will one of your students typically spend each day in a teacher-directed group math lesson? *(Write the number of minutes in the blank space.)*.......... ________

7. How many minutes total in a day do your students spend in math class? *(Write the number of minutes in the blank space.)*.......... ________

8. Are there any students in your math class who regularly receive additional math instruction from a special math teacher? *(Check one and follow the indicated direction.)*

    ____ A. Yes.........*Go to Item 9.*

    ____ B. No..........*Skip Item 9. Go to Item 10.*

9. With respect to such additional math instruction from a special teacher...

    a. About how many students in your math class receive such instruction? *(Write the number in the blank space.)*................ ________

    b. About how many minutes of such instruction does an individual student receive each week, on the average? *(Write the number in the blank space.)*................ ________

10. On the average, how many minutes of math seatwork do you assign each day to your math class to be done outside of the time you actually spend teaching math? *(Write the number of minutes in the blank space.)*.. ________

11. During a math class, when a student is not in a teacher-directed math group, what type of activity is a student most likely to be doing? *(Put the number 1 next to the activity you use most often, a 2 next to the activity you use next most often, and so on. Leave blank any activities you do not use.)*

    ____ a. Lesson-related math seatwork

    ____ b. Starting lesson-related math homework

    ____ c. Drill and practice of basic facts or review drill on all algorithms

    ____ d. Seatwork in other subject areas

    ____ e. Other - specify ______________________________

12. Do you assign math homework? *(Check one and follow the indicated direction.)*

______ A. Yes....*Answer Items 13 and 14.*

______ B. No.....*Skip Items 13 and 14. Go to Item 15.*

13. Does this homework include incompleted seatwork? *(Check one.)*

______ A. Yes

______ B. No

14. What is a typical math homework assignment? *(Put the number 1 next to the assignment you give most often, a 2 next to the assignment you give next most often, and so on. Leave blank any assignments you do not give.)*

______ a. Drill on basic facts or operations

______ b. Review of earlier lessons

______ c. Practice on today's lesson

______ d. Other - specify ______________________________

15. What is the basic curriculum or text series you actually use in the teaching of math? *(Write the complete title and the publisher on the line below.)*

Title Publisher

____

16. Have you used this text in the past?

______ A. Yes....*Go to Item 17. Skip Item 18.*

______ B. No.....*Skip Item 17. Go to Item 18.*

17. What page of the basal is today's lesson based upon? *(Enter today's basal page, total number of pages in the book, and today's date.)*

Page ______ on ____________________
(date)

Total number of pages in the basal ______

18. In addition to the student basal text, what other basal text series materials (e.g., student workbook, student dittos, mastery tests, student profile cards, teacher's manual, supplementary aids, scope and sequence) do you or your students use in math? *(Write the title and publisher, or other information, on the lines below.)*

Title, publisher, or other description

____

____

____

____

19. In addition to the basal series materials, what supplementary materials do you use in teaching math? *(Write the title and publisher, or other descriptive information, on the lines below.)*

Description

____

____

____

____

MOTIVATORS

Items 20 - 27

20. On the average, how often do your student assignments include the use of the instructional media listed below? (Put an X in the circle of your choice for each mode of instruction.)

	Times per week				
	Never	Less than once	1-2 times	3-4 times	5 or more times
a. Math textbooks.............	0	-1	1-2	3-4	5+
b. Workbooks or sheets.........	0	-1	1-2	3-4	5+
c. Books from the school library..................	0	-1	1-2	3-4	5+
d. Other books................	0	-1	1-2	3-4	5+
e. Audiotapes.................	0	-1	1-2	3-4	5+
f. Filmstrips with cassettes from the school library...	0	-1	1-2	3-4	5+
g. Other filmstrips with cassettes..................	0	-1	1-2	3-4	5+
h. Single filmstrips from the school library............	0	-1	1-2	3-4	5+
i. Other single filmstrips....	0	-1	1-2	3-4	5+
j. Games and puzzles..........	0	-1	1-2	3-4	5+
k. Flash cards................	0	-1	1-2	3-4	5+
l. Manipulatives..............	0	-1	1-2	3-4	5+
m. Records from the school library..................	0	-1	1-2	3-4	5+
n. Other records..............	0	-1	1-2	3-4	5+
o. Transparencies from the school library............	0	-1	1-2	3-4	5+
p. Other transparencies.......	0	-1	1-2	3-4	5+

21. After a student completes a math assignment, how soon, on the average, do you give that student information on the correctness of his/her performance? *(Put an X in the circle of your choice for each type of assignment.)*

	Within a week	Within 2-3 days	Within 24 hours	Within 1-3 hours	Within an hour or less	With a fe minut
a. Drill sheet...............	①	②	③	④	⑤	⑥
b. Homework.................	①	②	③	④	⑤	⑥
c. Chapter or unit tests....	①	②	③	④	⑤	⑥
d. Special math assignment..	①	②	③	④	⑤	⑥

(Specify_________________

_____________________)

22. In general, how interesting to the students are the math books and materials listed below? *(Put an X in the circle of your choice. Use the scale given below.)*

1 = Very uninteresting
2 = Somewhat uninteresting
3 = OK
4 = Somewhat interesting
5 = Very interesting

	Very uninteresting				Very interesting
a. Basic math textbooks....	①	②	③	④	⑤
b. Workbooks (if used).....	①	②	③	④	⑤
c. Supplementary math materials...............	①	②	③	④	⑤

23. During an average week, how often does each of the following activities occur during math instruction? *(Put an X in the circle of your choice for each activity.)*

	Times per week				
	Never	Less than once	1-2 times	3-4 times	5 or more times
a. How often are students given an opportunity to manage their own in-class behavior, for example, by getting and returning materials?.........	0	-1	1-2	3-4	5+
b. How often do students do peer tutoring or help each other on assignments?.........	0	-1	1-2	3-4	5+
c. How often do students assess their own work, for example, by scoring their own papers?	0	-1	1-2	3-4	5+
d. How often do you have conversations with students about nonschool matters, such as their family, pets, hobbies, or personal problems?....................	0	-1	1-2	3-4	5+
e. How often do you have formal or informal meetings with school personnel such as counselors or other teachers to discuss academic or non-academic problems of individual students?.........	0	-1	1-2	3-4	5+

24. What kinds of prizes, privileges, or other verbal or nonverbal rewards do you use to encourage good academic work in math and good classroom behavior and discipline? *(Check all that apply in each column below.)*

	Good academic work	Good classroom behavior
a. Oral praise to the student....................	____	____
b. Written comments to the student..............	____	____
c. Tangible rewards such as stars, candy, certificates or other items..................	____	____
d. Giving the student free time.................	____	____
e. Excusing the student from assignments........	____	____
f. Letting the student select some special activity....................................	____	____
g. Displaying student work......................	____	____
h. Writing a note to the student's parents......	____	____

25. What other kinds of rewards do you use to encourage good academic work in math and good classroom behavior and discipline?

(Write a brief answer on the lines below. Be sure to indicate if these rewards are used to encourage good academic work or good behavior or both.)

	Good Academic work	Good classroom behavior
________________________________	____	____
________________________________	____	____
________________________________	____	____

26. What kinds of things do you do to reprimand or punish students for poor academic performance in math and inappropriate classroom behavior and discipline? *(Check all that apply in each column below.*

	Poor academic work	Poor classroom behavior
a. Write a note to the student's parents......	___	___
b. Send the student to the office.............	___	___
c. Separate the student from the class group, for example, within the classroom or coat closet, or outside the door................	___	___
d. Give the student extra work................	___	___
e. Take away privileges such as recess........	___	___
f. Physical restraint.........................	___	___
g. Oral reprimand.............................	___	___
h. Nonverbal signals such as eye contact or a frown..................................	___	___

27. What other kinds of things do you do to reprimand or punish students for poor academic performance in math and inappropriate classroom behavior and discipline?

(Write a brief answer on the lines below. Be sure to indicate if the actions are used to reprimand poor academic work or poor classroom behavior or both.)

	Poor academic work	Poor classroom behavior
______________________________	___	___
______________________________	___	___
______________________________	___	___

STRUCTURE

Items 28 - 47

28. In the daily planning for your math class, what sources do you follow? *(Put the number 1 next to the source you use most often, a 2 next to the source you use next most often, and so on. Leave blank any sources you do not use.)*

_____a. A teacher's manual for a math text

_____b. A school math guide

_____c. A school district math guide

_____d. Your own math plan

_____e. Other - specify_______________________________

29. Listed below are some possible sources of objectives for teaching math. Which of them do you use as a source of math objectives? *(Put the number 1 next to the source you use most often, a 2 next to the source you use next most often, and so on. Leave blank any sources you do not use.)*

_____a. Objectives from the commercial math program.

_____b. A set of school district objectives

_____c. A set of objectives used primarily in your school

_____d. Objectives that you, or another teacher, devised

_____e. Objectives from some other source - specify the source_______________________________

_____f. I do not use a list of math objectives... *(Skip Item 31. Go to Item 32.)*

30. What techniques do you use to make students aware of specific instructional objectives they are to master in math? *(Put the number 1 next to the activity you use most often, a 2 next to the activity you use next most often, and so on. Leave blank any activities you do not use.)*

______ a. Point out the objectives in the text

______ b. Begin the lesson by giving an example of what is to be learned

______ c. Begin the lesson by stating and explaining the objectives to be learned

______ d. Do not make the students aware of the objectives directly

______ e. Other - specify ______________________________

31. How often do you add or delete objectives included in the curriculum, on the average? *(Check one.)*

______ A. Never

______ B. Less than once a week

______ C. 1 or 2 times a week

______ D. 3 or 4 times a week

______ E. 5 or more times a week

32. With respect to your math curriculum...

a. Do you cover all the units in order? *(Check one and follow the indicated directions.)*

____A. Yes...*(Skip the rest of this item. Go to Item* 33.*)*

____B. No....*(Answer the remaining parts of this item.* Skip Item 33 and go to Item 34.)

b. What units do you skip? *(List these briefly below by title or subject.)*

____

____

____

c. Which units do you emphasize less than others? *(List these briefly below by title or subject.)*

____

____

____

d. Which units do you reorder? *(List these briefly below by title or subject.)*

____

____

____

33. How far did you get in the text by the end of the school year? (Indicate the page or chapter.)______________________

34. With respect to your math curriculum...

a. Which units need supplementary materials the most? *(List these briefly below by title or subject.)*

____

____

____

b. Why do these units need supplementary materials? *(Check all that apply.)*

____a. The units are taught poorly in the curriculum

____b. The units do not give students enough practice

____c. Other - specify____________________________

____

35. How appropriate are the materials listed below for meeting the needs of your students in math class? *(Put an X in the circle of your choice for each type of material. Use the scale given below:)*

1 = Entirely inappropriate
2 = Mostly inappropriate
3 = Somewhat appropriate
4 = Mostly appropriate
5 = Entirely appropriate

	Entirely inappropriate				Entirely appropriate
a. Basic math text materials.....	①	②	③	④	⑤
b. Supplementary math materials..	①	②	③	④	⑤

36. At the beginning of the school year, how do you decide where a student in your class should start in math? *(Put the number 1 next to the method you use most often, a 2 next to the method you use next most often, and so on. Leave blank any methods you do not use.)*

_____a. By starting at the beginning of the text or series

_____b. By the results of a standardized test

_____c. By the results of a placement test that comes with the math text or series

_____d. By the results of a test that you developed

_____e. From the placement of a student at the end of the previous school year

_____f. Other - specify ________________________________

37. Does the math text or series you use contain a placement test for placing students in the math materials? *(Check one and follow the indicated directions.)*

_____A. Yes.......... *Go to Item 38.*

_____B. No........... *Skip Item 38. Go to Item 39.*

_____C. Don't know... *Skip Item 38. Go to Item 39.*

38. How easy is it to use the results of the math placement test to match students and math materials? *(Check one.)*

_____A. Usually very easy

_____B. Fairly easy

_____C. Fairly difficult

_____D. Usually very difficult

39. On the average, how frequently are your students formally tested for mastery of math skills? *(Check one.)*

_____ A. Never

_____ B. Less than once a week

_____ C. 1 or 2 times a week

_____ D. 3 or 4 times a week

_____ E. 5 or more times a week

40. How do you assess student mastery of specific math skills? *(Put the number 1 next to the method you use most often, a 2 next to the method you use next most often, and so on. Leave blank any methods you do not use.)*

_____a. Your own informal judgment

_____b. By the results of an assessment test that comes with the math text or series

_____c. By the results of a test that you developed

_____d. Other - specify_______________________________

41. How are the results of mastery tests used? *(Check all that apply.)*

_____a. For grading

_____b. For assessing mastery

_____c. For diagnosis or placement

_____d. For assigning specific materials to students

_____e. Other - specify_______________________________

42. What methods are used to record student mastery in math so that such information can be used by other teachers or staff members? *(Check all that apply.)*

____ a. Commerical skills checklists or student profiles

____ b. School or district skills checklists or profiles

____ c. Formal or informal teacher conferences

____ d. Teacher grade books

____ e. Folders of student work

____ f. None

____ g. Other - specify ______________________________

43. Do you find that such records are generally accurate and helpful to you in placing students? *(Check one.)*

____ A. Yes, both accurate and helpful

____ B. Usually accurate but not very helpful

____ C. Neither accurate nor helpful

44. If a student does not pass a math test...

a. What does the math program suggest that you should do?

b. What procedures do you actually use?

(Check all that apply in both columns below.)

	Suggested for use	Actually used
a. Tutor the student..............................	______	______
b. Give special work..............................	______	______
c. Continue......................................	______	______
d. Give extra homework............................	______	______
e. Repeat the materials covered...................	______	______
f. Other - specify ______________________________	______	______

45. Within your math class, are student assignments mostly the same for all the students, or do they tend to be more individualized for each student's needs? *(Check one.)*

_____A. All assignments are the same

_____B. Most are the same; a few are individualized

_____C. Many are the same; several are individualized

_____D. Most are individualized

_____E. All assignments are individualized

46. When students have completed a unit or chapter, how do you decide what unit or chapter should be worked on next? *(Put the number 1 next to the method you use most often, a 2 next to the method you use next most often, and so on. Leave blank any methods you do not use.)*

_____a. By following the sequence recommended by the district curriculum

_____b. By following the sequence of the math text or series

_____c. By following a sequence you developed based on the school/district or textbook sequence

_____d. By following a sequence you developed entirely on your own

_____e. Other - specify ______________________________

47. How familiar are you with the math programs in use in other grades? *(Check one.)*

_____A. Completely familiar

_____B. Mostly familiar

_____C. Somewhat familiar

_____D. Mostly unfamiliar

_____E. Completely unfamiliar

Appendix C-2 continued

INSTRUCTIONAL EVENTS

Items 48 - 54

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48. On the average, how many times per week does each of the following activities occur in your math instruction? *(Put an X in the circle of your choice for each activity.)*

	Times per week				
	Never	Less than once	1-2 times	3-4 times	5 or more times
a. How often do you work with students outside of math class on math skills with which they are having difficulty?....................	0	-1	1-2	3-4	5+
b. How often does a lesson include your demonstration using a manipulative (rods, blocks, counters, fraction pieces, etc.)?.........................	0	-1	1-2	3-4	5+
c. How often does a lesson involve students' using a manipulative?	0	-1	1-2	3-4	5+

49. Approximately how much of your total instructional time during math class is spent working with the entire class, small groups of students, and individual students? *(Write the percentage on the lines below. Be sure that the figures add up to 100%.)*

% of total instruction time

a. Entire class.......... ______ %
b. Small groups.......... ______ %
c. Individual students.. ______ %
Total................ 100 %

50. During a typical day, how many students do you usually work with on an individual basis in math class?
(Write the number in the blank space.)................ ______

51. How much of a problem are disruptive behaviors when teaching math to your classes? *(Check one.)*

____A. Major problem

____B. Minor problem

____C. No problem

52. On the average, during a typical math class, how often do disruptive student activities interfere with your instruction? *(Check one.)*

____A. Never

____B. Less than once per class

____C. 1 or 2 times per class

____D. 3 or 4 times per class

____E. 5 or more times per class

53. On the average, during a typical week, how often do you use aides or assistants to help you during math class? (Check one and follow the indicated directions.)

_____A. Never........................*Skip Item 54. Go to Item 55.*

_____B. Less than once a week

_____C. 1 or 2 times a week

_____D. 3 or 4 times a week

_____E. 5 or more times a week

.....*Answer Item 54.*

54. What types of tasks do you assign to such aides or assistants? *(Put the number 1 next to the task you assign most often, a 2 next to the task you assign next most often, and so on. Leave blank any tasks you do not have aides perform.)*

_____a. Scoring student work

_____b. Helping students practice basic facts

_____c. Helping students with their daily work

_____d. Leading small group lessons

_____e. Testing students

_____f. Keeping records

_____g. Playing math games with students

_____h. Teaching student use of math games or math manipulatives

_____i. Duplicating, filing, or typing materials

_____j. Other - specify ________________________

TEACHER PERCEPTIONS

Items 55 - 56

55. Listed below are some possible topics for inservice programs or workshops. Which ones would be most useful to you in your teaching of math? *(Put an X in the circle of your choice for each topic.)*

	Not useful	Useful	Very useful
a. Use and interpretation of standardized test results to plan teaching...............	①	②	③
b. Diagnosis of specific problems in learning math..............................	①	②	③
c. Remediation of specific problems in learning math..............................	①	②	③
d. How to integrate existing supplementary materials into the curriculum and how to manage their use in the classroom........	①	②	③
e. Use and management of manipulative materials..................................	①	②	③
f. How to manage small group instruction.......	①	②	③
g. How to individualize instruction............	①	②	③
h. Content review of material and organization of different math series and texts..........	①	②	③
i. Teaching applications of math skills........	①	②	③
j. Teaching metric measurement.................	①	②	③
k. Classroom use of the hand-held calculator...	①	②	③
How to develop a specific concept *(Specify concept)*____________________	○	②	○
Other - specify____________________	○	②	○

56. In general, how well trained do you think you are in the use of materials and techniques for the teaching of mathematics?

_____ A. Extremely well trained

_____ B. Very well trained

_____ C. Fairly well trained

_____ D. Somewhat poorly trained

_____ E. Very poorly trained

COLONIAL NORTHAMPTON INTERMEDIATE UNIT NUMBER 20
299 Industrial Park Road
P. O. Box 179
Nazareth, Pennsylvania 18064

PROGRAM ANALYSIS CLASSROOM OBSERVATION SCHEDULE

DATE ______________________ LEVEL ______________________

TIME ______________________ TOTAL NUMBER OF STUDENTS ______________________

OBSERVED ______________________

GENERAL CLASSROOM ENVIRONMENT

	Unit 1	Unit 2	Unit 3
Grouping			
Teacher Directed - Individual			
Teacher Directed - Small			
Teacher Directed - Total Group			
Teacher Supervised Independent Work			
Non-supervised Independent Work			
Other ______________			
Stimulus Mode			
Listen			
Watch/See			
Touch/Manipulate			
Read or Look at Pictures			
Other ______________			
Response Mode			
Oral			
Written			
Manipulative			
Physical/Movement			
Other ______________			
Materials			
Teacher Made ______________			
Pupil Made ______________			
Textbook			
Workbook			
Dittoed Worksheets			
Other Commercial Materials			
Other ______________			
AV Equipment			
Overhead Projector			
Movie or Filmstrip Projector			
Tape Recorder			
Other ______________			

What kinds of bulletin boards or other displays related to mathematics were in view in the classroom?

Comments:

Observation Unit______ Time______ N = ________

STUDENT

Maintains and/or Completes Tasks (Check Negative Instances)

No. Students_________ Amt. Time_________

Comments:

Pennsylvania School

Improvement Program

PROGRAM ANALYSIS

Mathematics

Administrator Form

Directions

1. *Complete the identifying information below. Do not put your name on this questionnaire.*
2. *On the following pages, mark your answers according to the directions given in italics after each question.*

a. What is your position title? ______________________________

b. Name of your school (if applicable) ______________________________

c. District name ______________________________

Bangor

Code ______

OPPORTUNITY

Items 1 - 9

1. So far during the school year, how many children have transferred into and out of your school? *(Write the numbers in the blank spaces.)*

   a. Number transferred in..... __________

   b. Number transferred out.... __________

2. How many student days are in a school year? *(In figuring this, exclude inservice days and other days that only the administrative staff or teachers spend in school. Write the number of days in the blank below.)*

   Number of days............... __________

3. At what times do the following normally happen in a school day in your school? *(Write the times in the blank spaces.)*

   a. Students arrive at school........... __________

   b. Classes begin........................ __________

   c. Students are dismissed for the day.. __________

4. How many minutes are scheduled for recess and lunch period for a typical student each day in your school? *(Write the number of minutes in the blank spaces.)*

   a. Recess..................... __________

   b. Lunch...................... __________

5. On the average, during a typical month, how many school days are shortened or cancelled due to late starts, early dismissals, snow, emergencies, and so on? *(Check one.)*

_____ A. None

_____ B. Less than one day

_____ C. 1 or 2 days

_____ D. 3 or 4 days

_____ E. 5 or more days

6. How many minutes are scheduled each day for a typical student for math or math-related instruction? *(Write in the number of minutes in the blank spaces.)*

a. Kindergarten........... _________

b. Grades 1-3 .... _________

c. Grades 4-6 .... _________

7. What is (are) the principal math texts or series used in your school? In what grades (or ability or achievement level groups) are these used? *(Write your answers on the lines below.)*

Title	Publisher	Grade (or other group designation)

8. What standardized tests are used in your school to measure overall achievement in math? In what grades are these tests administered? *(For each test that you use, write the grade levels in which the test is given in the blank space following the test name.)*

	Grades in which test is given
a. California Achievement Test (CAT)..................	________
b. Comprehensive Tests of Basic Skills (CTBS)..........	________
c. Iowa Test of Basic Skills (ITBS)..................	________
d. Metropolitan Achievement Tests (MATS)..............	________
e. SRA Achievement Tests..............................	________
f. Sequential Tests of Educational Progress...........	________
g. Stanford Achievement Test (SAT)....................	________
h. Wide Range Achievement Test (WRAT).................	________
i. Other - specify ______________________________	________

9. During what months of this school year is this test administered to classes in your school? *(Check all that apply. If you administer more than one of the tests listed in the previous item, be sure to indicate during which months which tests are given.)*

_____ a. September

_____ b. October

_____ c. November

_____ d. December

_____ e. January

_____ f. February

_____ g. March

_____ h. April

_____ i. May

_____ j. June

STRUCTURE

Items 10 - 12

10. How do you and your staff use the results from the standardized tests in teaching math? *(Check as many as apply.)*

_____ a. Diagnosing areas of student strength and weakness

_____ b. Identifying remedial students

_____ c. Assigning personnel (such as aides)

_____ d. Ordering materials

_____ e. Other - specify ______________________________

11. What methods do you use to record or report student math achievement so that such information can be used by teachers from one grade to the next? *(Check all that apply.)*

_____ a. Commercial skills checklists or student profiles

_____ b. School or district skills checklists or profiles

_____ c. Formal or informal teacher conferences

_____ d. Teacher grade books

_____ e. Folders of student work

_____ f. None

_____ g. Other - specify ______________________________

12. In planning for their daily math classes, what sources do teachers follow? (Put the number 1 next to the source used the most often, a 2 next to the source used the next most often, and so on. Leave blank any sources teachers do not use.)

_____ a. A teacher's manual for a math text

_____ b. A school math guide

_____ c. A school district math guide

_____ d. The teacher's own plan

_____ e. Other - specify______________________________

ADMINISTRATOR PERCEPTIONS

Items 13 - 14

13. In general, how well trained are the math teachers in this school in the use of materials and techniques for the teaching of math?

______A. Extremely well trained

______B. Very well trained

______C. Fairly well trained

______D. Somewhat poorly trained

______E. Very poorly trained

14. Listed below are some possible topics for inservice programs or workshops for teachers. Which ones would be most useful to your teaching staff in their teaching of math? *(Put an X in the circle of your choice for each topic.)*

		Not Useful	Useful	Very Useful
A.	Use and interpretation of standardized test results to plan teaching....................	①	②	③
B.	Diagnosis of specific problems in learning math..	①	②	③
C.	Remediation of specific problems in learning math..	①	②	③
D.	How to integrate existing supplementary materials into the curriculum and how to manage their use in the classroom...........	①	②	③
E.	Uses and management of manipulative materials................................	①	②	③
F.	How to manage small group instruction.......	①	②	③
G.	How to individualize instruction............	①	②	③
H.	Content review of material and organization of different math series and texts..........	①	②	③
I.	Teaching applications of math skills........	①	②	③
J.	Teaching metric measurement.................	①	②	③
K.	Classroom use of the hand-held calculator...	①	②	③
L.	How to develop a specific concept *(Specify concept)* ____________________	①	②	③
M.	Other - specify ____________________ ____________________	①	②	③

PENNSYLVANIA SCHOOL IMPROVEMENT PROGRAM

PROGRAM ANALYSIS REPORT

for

Mathematics

May 30, 1979

This report summarizes responses given to questions on the program analysis instruments by (1) teachers of kindergarten and transitional classes, (2) teachers of primary classes, (3) teachers of intermediate classes, and (4) the building principal. Information obtained through observation of mathematics classes is also presented.

Results are presented by the constructs of (1) Opportunity, (2) Motivaters, (3) Structure, and (4) Instructional Events. A brief summary of what the research says about each construct has been provided to assist in interpretation of results.

OPPORTUNITY

The opportunity children are given to learn what they will be tested on is what the construct of "Opportunity" is representing in the Cooley-Lohnes model. If, for example, students are to be tested on arithmetic skills at the end of each year, then the amount of time that students could work on those arithmetic skills in the classroom during the year would be an appropriate opportunity measure.

There are two main aspects to the opportunity construct. Each of these is referred to as a variable. One has to do with how time is allocated, i.e., how much time is allocated for learning and how much of this time students are actually actively engaged in learning the task at hand. This variable is referred to as "time." The other has to do with how good the fit is between what is being taught in the classroom and what is being tested for on the tests of achievement. This is referred to as "criterion-relevant instruction."

OPPORTUNITY

1. Total amount of time spent in school (calculated from such indices as average daily attendance, length of school day, and length of school year) is positively related to achievement in reading and mathematics (Bond and Dykstra, 1967; Harris et al., 1968; Wiley and Harnischfeger, 1974).
2. Greater student outcomes are achieved when time in class is spent on task-related academic activities rather than on non-academic activities. Greater amounts of time spent in the classroom on reading and arithmetic and lesser amounts of time spent on such activities as arts and crafts, music, and dancing were found to correlate with higher achievement scores in reading and arithmetic. Academically-engaged time is thus an important determinant of student achievement (Bloom, 1976; Guthrie, in press; Harris and Serwer, 1966; McDonald and Elias, 1976; Stallings and Kaskowitz, 1974; Soar, 1973).
3. The amount of a subject covered is critical in determining student performance. Students must have the opportunity to learn what they will be tested on. Greater amounts of content covered lead to higher achievement scores (Harris and Serwer, 1966; McDonald and Elias, 1976, Pidgeon, 1970).

TEACHER QUESTIONNAIRE RESULTS: OPPORTUNITY

Kindergarten (K) and Transitional (T) Classes

- All kindergarten and transitional teachers report that students are not assigned so that the class has a somewhat uniform ability in math.

- Enrollment in math classes is reported as 16 - 24.

- Teachers differed in reporting on how frequently math instruction is interrupted by fire drills, hallway noise, and so on.

  One teacher reported "never."
  One reported "Less than once a week."
  One reported "One or two times a week."

- Students spend 15 - 20 minutes each day in a teacher-directed math lesson.

- Students spend 20 - 30 minutes each day in math class.

- As much as 100 per cent and as little as 50 per cent of the math class is spent in a teacher-directed math lesson.

- None of the K or T students regularly receive additional math instruction.

- Students are assigned an average of 10 - 15 minutes of math seatwork each day to be done outside of the time the teacher actually spends teaching math.

- During a math class when a student is not in a teacher-directed math group, the activity the student is most likely to be doing differs for each class:

  One teacher uses reinforcement activities in the form of centers or games.
  One teacher uses seatwork in other subject areas.
  A third teacher uses lesson-related math seatwork and drill and practice of basic facts or algorithms.

- Teachers do not assign math homework.

- Three different text series are in use:

  1. MCP Math Readiness - Modern Curriculum Press +1.
  2. Readiness in Math - Sullivan Associates.
  3. Math in Our World - Ceddison Wesley

- Two teachers had used the current text in the past.

- Of two teachers using MCP Math Readiness, a 112 page text, based April 10's lesson on page 67 and the other on page 84. Both teachers cover all units in order. At this rate the first teacher will not complete the text but the second one will.

- In addition to the student basal text, teachers use Schaeffer Dittos and Exploring Math, Holt, Rinehat and Winston materials.

- Supplementary materials used include:

    K1 K2 Math Readiness - Continental Press +1.
    flannel board
    slides
    bulletin boards
    filmstrips
    games
    listening games - Continental Press
    overhead
    teacher-made games and activities

Primary Classes

- All primary teachers report that students are not assigned so that the class has a somewhat uniform ability in math.

- Average math class enrollment is 21.5.

- Average attendance on April 10 was 21. All but one teacher reported that the day's attendance was typical. One reported that usually fewer students are present.

- Primary teachers reported that math instruction is interrupted for fire drills, assemblies, hallway noise, and so on. Most (8) reported that this occurs less than once a week, but three teachers reported that this occurs once or twice a week.

- The amount of time students spend in math class daily varies as follows:

# minutes	# classes
35	1
40	2
45	7
60	1

- The amount of time one student typically spends in a teacher-directed group math lesson varies as follows:

# minutes	# classes
15	1
20	7
25	1
30	2

- Two of eleven teachers reported that there are students in their math classes who regularly receive additional math instruction from a special math teacher. One student from one class and two students from another class each receive two and one half hours of instruction per week.

- All primary teachers assign math seatwork to be done outside of the time math is taught as follows:

# minutes	# classes
10	1
15	5
20	3
25	2

- Teachers were asked to identify what type of activity a student is most likely to be doing during a math class and when a student is not in a teacher-directed math group. The most commonly identified first choice was lesson-related math seatwork. Most teachers also chose drill and practice of basic algorithms or facts. Some teachers also have students start lesson-related homework, do seatwork in other subject areas, and use learning centers, games, and concrete materials.

- Seven of eleven primary teachers assign math homework; four do not.

- Of the seven who do, two indicated that it includes incompleted seatwork. Five indicated that it does not.

- The most commonly assigned math homework is practice on today's lesson. Review of earlier lessons and drill on basic facts or operations is also assigned by most teachers.

- The basic text in all classes is Exploring Elementary Mathematics, Holt, Rinehart and Winston. All but one teacher had used the text in the past.

- Projected completion/non-completion of text is as follows:

April 10	Pages in text	Project page end of year
139	192	178 - not complete.
127	192	163 - not complete.
312	343	Does not cover units in order.
193	343	Does not cover units in order.
198	343	254 - not complete.
239	343	Does not cover units in order.
106	208	Does not cover units in order.
148	208	Does not cover units in order.
123	208	158 - not complete.

- Basal text series materials in addition to Exploring Elementary Mathematics are also in use:

1. Practice Pads - Silver Burdett
2. Basic Math B - American Book
3. Math In Our World - Addison Wesley
4. Greater Cleveland Math - SRA
5. Ditto masters from texts.
6. Other commercial ditto masters.
7. Exploring Elementary Math Exercises, Holt, Rinehart and Winston.
8. Learning Center Packs.
9. Primary Supplementals of Arithmetic Masters, Prentice Hall

10. Frank Schaeffer Publishing Company - Masters.

- Other supplementary materials in use include:

  1. Instructo Seasonal Math Dittos.
  2. Math Game Art - Instructo.
  3. Math Centers.
  4. Teacher-made A-V aides.
  5. Bulletin boards.
  6. Frank Schaeffer masters.
  7. Games.
  8. Primary Fundamentals of Arithmetic, Prentice Hall.
  9. The Metric System, Millihen Publishing Company.
  10. Puzzles.
  11. Teacher-made dittos.
  12. Flash cards.
  13. DLM Math Lab.
  14. Floor number line.
  15. Flannel board and materials for sets.
  16. Chalkboard.

Intermediate Classes

. One teacher reported have a class of uniform average ability.

. Eight teachers reported that students are not assigned to the class so as to have somewhat uniform ability in math.

. Average enrollment in intermediate math classes is 26.

. The average number of students present in math class on April 10 was 25. Teachers reported that attendance was typical.

. All intermediate teachers report that math instruction is interrupted by fire drills, assemblies, and hallway noise 1-4 times a week.

. Time intermediate students spend in math class varies as follows:

Number of Minutes	Number of Classes
40	2
45	2
50	4
60 - 65	1

. The amount of time intermediate students typically spend in a teacher directed group math lesson varies as follows:

Number of Minutes	Number of Classes
15	3
20	3
25	2
30	1

. Two of seven intermediate teachers reported that there are students in their math classes who regularly receive additional math instruction from a special math teacher. A total of six intermediate students receive special math instruction for 30 - 150 minutes for one week.

. All teachers assign math seatwork daily to be done outside of the time math is taught.

Number of Minutes	Number of Classes
10	2
15	2
20	1
30	4

. The most likely activity a student will be doing during a math class when not in a teacher-directed math group is starting lesson - related math homework (7/9). Students also do lesson related math seatwork (6/9), drill and practice basic facts or algorithms (7/9), and do seatwork in other subject areas (4/9).

. All intermediate teachers assign math homework. Two out of nine indicated that this may include incompleted seatwork. Seven said it did not.

. The most common math homework assignment is practice on the day's lesson (9/9). Teachers also assign review of earlier lessons (4/9), drill on basic facts or operations (3/9) and other tasks (2/9).

. The basic text in all intermediate classes is Exploring Elementary Math, Holt, Rinehart, and Winston. Each text is 370-373 pages in length.

. None of the teachers reported following the units in order.

. All teachers had used the text in the past.

. Basal text series materials used in addition to Exploring Elementary Math include:

1. Duplicating masters and workbooks for Exploring Elementary Math.
2. Continental Press dittos.
3. Economy Continuous Progress Lab.
4. Row-Peterson Arithmetic (second edition).
5. Row-Peterson Arithmetic Workbooks
6. Workbook for Modern Arithmetic Through Discovery; Silver Burdett Company.

. Other supplementary materials in use include:

1. Hayes Solving Math Mysteries.
2. Modern Mathematics; Continental Press, Inc.
3. Filmstrips and transparencies.
4. Measuring Metrics.
5. Teacher-made activity box of 40+ activites to reinforce times tables.
6. Measuring Metrics Kit A-B-C.
7. Newspaper
8. Baseball cards.

ADMINISTRATOR QUESTIONNAIRE - OPPORTUNITY

- So far this school year, 47 students have transferred in and 30 have transferred out.
- There are 180 days in the student school year.
- Students arrive at 8:10 A.M. Classes begin at 8:30 A.M. Students are dismissed for the day at 3:50 P.M.
- Scheduled recess time is 30-45 minutes daily. Scheduled lunch time is 30 minutes daily.
- On the average, less than one day a month is shortened or cancelled.
- The amount of time scheduled for math-related instruction is as follows:

Kindergarten	25 minutes
Grades 1-3	40 minutes
Grades 4-6	45 minutes

- The principal math series in use is Exploring Elementary Mathematics; Holt, Rinehart, and Winston for grades 1-6.
- SRA Achievement Tests are administered in grades 3-6 in May.

MOTIVATORS

According to the Cooley-Lohnes model, motivation can be viewed as being internal or external. External motivation refers to all the elements in an educational environment that increase the likelihood that students will engage in and sustain learning activities. The variable name assigned to this aspect of the construct is "curriculum motivators." Internal motivation refers to student behaviors and attitudes that tend to support high rates of learning. This variable is referred to as "interpersonal motivators."

MOTIVATORS

1. Higher achieving classrooms are characterized as being "convivial, cooperative, democratic, and warm," whereas in lower achieving classrooms there is more belittling, shaming of students, and use of sarcasm (Tikunoff, Berliner, and Rist, 1975).
2. Teacher criticism of student behavior, shouting, scolding, ridicule, and sarcasm are consistently negatively related to achievement (Solomon and Kendall, 1976).

TEACHER QUESTIONNAIRE - MOTIVATORS

Kindergarten and Transitional Classes

Teachers reported use or non-use of the following instructional media:

3-5 times/week

Math textbooks (2)
Workbooks or sheets (3)
Other books (1)
Audiotapes (1)
Filmstrips with cassettes from the school library (1)
Games & Puzzles (3)
Flash cards (2)
Manipulatives (3)
Records from the school library (1)

2 or less times/week

Filmstrips with cassettes from the school library (1)
Other filmstrips with cassettes (1)
Flash cards (1)
Other records (1)
Other transparencies (1)

Never Used

Math textbooks (1)
Books from the school library (2)
Other books (2)
Audiotapes (1)
Filmstrips with cassettes from the school library (1)
Other filmstrips with cassettes (1)
Single filmstrips from the school library (1)
Other single filmstrips (1)
Records from the school library (1)
Other records (1)
Transparencies from the school library (2)
Other transparencies (1)

- In all cases, kindergarten and transitional students receive feedback on the correctness of math performance on assignments, tests, and drill sheets within a few minutes.

- Students find textbooks and supplementary materials used to be interesting.

- All kindergarten and transitional students are given an opportunity to manage their own in-class behavior at least three times a week. All are given some opportunity to do peer tutoring or help each other on assignments.

- Two-thirds of the students have an opportunity to assess their own work, to have conversations with peers about nonschool matters, and to have formal or informal meetings with school personnel such as counselors or other teachers. One-third do not.

- All kindergarten and transitional teachers provide oral praise and tangible rewards to students to encourage good academic work and good classroom behavior. Some teachers also write a note to the student's parents, let the student select some special activity, display student work, write comments to the students, give the student free time, give the students colored tokens leading to a prize, name the student a leader, or in some other way provide recognition.

- The most frequently used interventions for poor classroom behavior are to write a note to the student's parents or to separate the student from the class group. Teachers might also take away privileges, reprimand orally, give non-verbal signals such as eye contact or a frown, send the student to the office, or use physical restraint.

- The most frequently used intervention for poor academic work is to write a note to the student's parents. Teachers might also separate the student from the class group, give the student extra work, or reprimand orally.

Primary Classes

Teachers reported use or non-use of the following instructional media:

3 or more times/week

- Math textbooks (5)
- Workbooks or sheets (9)
- Games & Puzzles (5)
- Flash cards (7)
- Manipulatives (7)

2 or less times/week

- Math textbooks (2)
- Workbooks or sheets (2)
- Book from the school library (3)
- Other books (5)
- Audiotapes (3)
- Filmstrips with cassettes from the school library (2)
- Other filmstrips with cassettes (2)
- Single filmstrips from the school library (3)
- Other single filmstrips (1)
- Games and Puzzles (6)
- Flash cards (4)
- Manipulatives (4)
- Records from the school library (2)
- Other records (5)
- Transparencies from the school library (4)
- Other transparencies (3)

Never Used

- Math textbooks (3)
- Books from the school library (8)
- Other books (6)
- Audiotapes (8)
- Filmstrips with cassettes from the school library (9)
- Other filmstrips with cassettes (9)
- Single filmstrips from the school library (8)
- Other single filmstrips (10)
- Records from the school library (9)
- Other records (6)
- Transparencies from the school library (7)
- Other transparencies (8)

. The speed of feedback to students on correctness of performance varies among primary teachers. All but one teacher gives students feedback on drill sheets within an hour or less; about half give feedback within a few minutes. One waits 24 hours.

. The majority of primary teachers wait a day or more to provide feedback on homework, chapter or unit tests, and special assignment; however, a few do so the same day.

. In general, primary students tend to find supplementary math materials interesting, workbooks somewhat less interesting, and the math textbook rather uninteresting.

. The most frequently used rewards for both good academic and good classroom behavior are oral praise, written comments, tangible rewards, and a note to the parents. However, a great variety of rewards are used, including:

Giving the student free time, excusing the student from assignments, letting the student select some special activity, displaying student work, naming leaders for an activity, giving special privilege, giving extra time with math games, allowing the student to assist with special duties, naming a citizen of the week, making positive comments, and giving stickers.

. The most common intervention for poor academic work is to write a note to the parents. Other interventions used include giving the student extra work, taking away privileges such as recess, oral reprimand, nonverbal signals, assigning extra work to be done with the parent, and insisting that work be completed before a film or special activity.

. The most commonly used interventions for poor classroom behavior include: nonverbal signals, oral reprimands, a note to parents, and separating the student from the group. Also used are taking away privileges, sending the student to the office, giving the student extra work, and completing work before films and special activities.

Intermediate Classes

Teachers reported the following use or non-use of instructional media:

3 or more times/week

- Math textbooks (9)
- Workbooks or sheets (3)
- Games and puzzles (3)
- Flash cards (1)

2 or less times/week

- Workbooks or sheets (6)
- Books from the school library (5)
- Other books (7)
- Audiotapes (2)
- Filmstrips with cassettes from the school library (1)
- Other filmstrips with cassettes (2)
- Single filmstrips from the school library (4)
- Other single filmstrips (2)
- Games and puzzles (6)
- Flash cards (9)
- Manipulatives (4)
- Records from the school library (2)
- Other records (3)
- Transparencies from the school library (3)
- Other transparencies (2)

Never Used

- Books from the school library (4)
- Other books (2)
- Audiotapes (7)
- Filmstrips with cassettes from the school library (7)
- Other filmstrips with cassettes (8)
- Single filmstrips (5)
- Other single filmstrips (7)
- Manipulatives (4)
- Records from the school library (7)
- Other records (6)
- Transparencies from the school library (6)
- Other transparencies (7)

- The majority of intermediate teachers give feedback on drill sheets, homework, tests, and assignments with a day (24 hours). A few teachers provide feedback more or less frequently than within 24 hours.

- Intermediate students tend to find the supplementary math materials somewhat interesting but the text and workbooks rather uninteresting.

- Most intermediate teachers give students an opportunity to manage their own in-class behavior three times per week or more. One teacher did this less than once per week.

- Most intermediate teachers give students the opportunity to do peer tutoring, to assess their own work, to have conversations with students about nonschool matters at least once per week.

- Most intermediate teachers have formal or informal meetings with school personnel to discuss problems of individual students at least once per week.

- The most frequently used rewards for both good academic and good classroom behavior include oral praise to the student and writing a note to parents.

STRUCTURE

"The construct of "Structure" deals with the degree to which a curriculum is organized and sequenced, the specificity of the objectives, and the manner in which a student and a curriculum are matched." (Cooley and Leinhardt, 1975, p. 6). There are three aspects to this construct. The first deals with the clarity and specificity with which instructional objectives are defined and has the variable name of "instructional objectives." The second aspect deals with how well students are matched with the curriculum and is referred to as "matching." The third deals with grouping practices in the classroom and is called "grouping." The final aspect of this construct deals with the sequencing and pacing of instruction and is referred to as "sequencing and pacing."

STRUCTURE

1. The most effective classroom organization has the teacher working with small groups of three to seven children or with large groups of eight or more children. Instances of children working alone or of one or two children working with the teacher consistently produce negative correlations with achievement (Stallings and Kaskowitz, 1974).
2. Low SES children profit more from seatwork or individually prescribed learning activities, and do not benefit from activities which require oral response. For children of high SES the opposite of these results holds true (Brophy and Evertson, 1974).
3. Lesson structure, "defined primarily as the teachers' preparation of students for a particular lesson" (Tikunoff, Berliner, and Rist, p. 382) is an important determinant of success. Teachers who are effective in producing high student achievement, inform students of the objectives of lessons, and of their own expectations for achievement, and link current lessons with material previously studied.

However, a variety of rewards are used, including written comments, tangible rewards, free time, excusing from assignments, special activities, displaying student work, extra recess, special friendship, homework free sheets, phoning parents, conference with parents, allowing student to place problems on board, child's name in lights, and a note home.

. The most commonly used interventions for both poor academic work or poor classroom behavior are a note to parents, nonverbal signals, and oral reprimands. However, a variety of interventions are used including sending the student to the office, separating the student from the class group, giving the student extra work, taking privileges away, noontime detention, and a parent-teacher-student conference.

TEACHER QUESTIONNAIRE: STRUCTURE

Kindergarten and Transitional

- The source used most often in daily planning for math class is the teacher's manual for a math test. One teacher uses her own math plan more. All teachers also use the district guide.
- The objectives from the commercial math program as weel as a school district set of objectives are sources of objectives used by all K or T teachers. One teacher draws from her own objectives more.
- All K and T teachers begin a lesson by stating and explaining the objectives to be learned. Some also give an example of what is to be learned or point out objectives in the text.
- Two of three teachers never add or delete objectives included in the curriculum. One reports doing so 3-4 times a week.
- Two cover all units in order; one does not.
- Because they do not give students enough practice, the following units need supplementary materials the most:

  Patterns
  Number Recognition
  Addition and Subtraction Facts to Five

- All K and T teachers view the math supplementary materials as appropriate, but one of the three teachers views the text as inappropriate.
- At the beginning of the year, two teachers decide where a student should start in math by starting at the beginning of the text or series. One uses the results of a test she developed.
- The series does not contain a math placement test.
- All students are formally tested for mastery of math skills twice a week or less.
- Student mastery of specific math skills is determined through teacher-made test and teacher judgment.
- Teachers differ in how they use the results of tests:

Use	No. of Teachers
For grading	1
For assessing mastery	2
For diagnosis and placement	1
For assigning specific materials	1

- Teachers differ in methods used to record student mastery in math so that such information can be used by other teachers or staff members:

Method	Number of Teachers
Commercial Skills Checklists or Student Profiles	1
Formal or informal teacher conferences	1
Folders of student work	2
Report card checklist	1

- All teachers found these records to be accurate, but only two of the three teachers found them to be helpful.

- The math program does not suggest procedures for when students do not pass tests. Teachers report that they tutor the student, repeat the materials covered, or give special work.

- Within each class, most students' assignments are the same; a few are individualized.

- Two of the three teachers follow the sequence of the math text or series. The third teacher follows her own on the district's sequence.

- There was a wide range of response concerning teacher familiarity with math programs used in other grades:

Response	Number of Teachers
Completely familiar	1
Somewhat familiar	1
Completely unfamiliar	1

Primary Classes

- In the daily planning for math class, all primary teachers follow the manual for the math text. All but one also follows their own math plans. One also follows the district math guide.

- One teacher does not use a list of math objectives.

- All other primary teachers use the objectives from the Holt, Rinehart, and Winston program as their major source of objectives for teaching math. Some use their own or other sources to supplement.

- One teacher does not make the students aware of objectives directly. All other primary teachers begin the lesson by giving an example of what is to be learned. Some use their own or other sources to supplement.

- One teacher does not make the students aware of objectives directly. All other primary teachers begin the lesson by giving an example of what is to be learned. Some also state or explain the objective to be learned or point out the objectives in the text.

- Most primary teachers add or delete objectives less than once a week. One never does. Two add or delete objectives three or four times a week.

- Half of the primary teachers cover the units in order and half do not.

- Some units some primary teachers skip include:

  Sections of Geometry and Fractions
  Geometry
  Multiplication
  Liquid Measurement
  Line Measurement
  Checking Problems

- Some units some primary teachers de-emphasize include:

  Geometry and Measurement
  Fractions
  Numeration
  Addition
  Subtraction
  Last one-third of book
  Regrouping
  Place Value
  Time
  Money

- Some units primary teachers reorder include:

  Review chapters for +. -, x, ÷ and return after fractions and geometry.
  Fractions and Geometry
  Regrouping
  Multiplication
  Time
  Money

Measurement
Calendar
Weights

- Units which need the most supplementary materials include:

  Addition with two and three addends
  Subtraction
  Number Line
  Tens and Ones
  Place Value
  Multiplication
  Fractions
  Regrouping
  Time
  Liquid Measure
  Comparing more than to less than
  Measurement
  Money
  Counting by 2's, 5's, 10's

- Usually, these units need supplementary materials because they do not give students enough practice.

- Most primary teachers see the basic math text and the supplementary math materials as being appropriate to meet the needs of students in the math class.

- To place students at the beginning of the school year, all primary teachers start at the beginning of the text or series. Some teachers also look at the results of a teacher-developed test and the placement of the student at the end of the previous school year.

- The math text series does not contain a placement test for students.

- About half of the primary students test students for mastery less than once a week. Half test 1 - 4 times a week.

- The majority of primary teachers use the results of a teacher-developed test and their own judgement in assessing student mastery of specific skills.

- The teacher-developed tests are also used by some teachers for grading, for assessing mastery, for assigning specific materials to students, and for diagnosis and placement.

- Half of the primary teachers record student mastery in teacher grade books. One fourth share information about student mastery at formal or informal teacher conferences. One fourth record student mastery by or on folders of student work. One teacher does not record mastery.

- Half of the primary teachers find such records to be accurate and helpful; half do not.

- The math program suggests no procedure to follow when a student does not pass a test.

- Most teachers, when a student fails a test, give special work or tutor the student. Some also continue the regular program, give extra homework, or repeat the materials covered.

- Within primary classes most assignments are the same; a few are individualized.

- All primary teachers follow the sequence of the math text to decide what unit or chapter to work on next but some also use a sequence recommended by the district curriculum guide or a sequence developed or adapted on their own.

- More than half of the primary teachers are unfamiliar with the math program used in other grades. The rest are only somewhat familiar.

Intermediate Classes

- In planning for the daily math class, most intermediate teachers use a combination of the teacher's manual for the text and their own math plan. Some also use a school or district math guide or other sources.

- One intermediate teacher does not use a list of objectives for teaching math. The remainder of the teachers use a variety of sources of objectives and generally differ as to what is the primary source.

- About half of the intermediate teachers do not make the students aware of the objectives directly. The rest of the teachers do but vary in how they do this, most using a variety of ways.

- All but one teacher sometimes adds or deletes objectives in the curriculum, most less than twice a week.

- None of the intermediate teachers cover all math units in order.

- Units some teachers skip include:
    - Ratio and Percent (1)
    - Graphs and Probability (1)
    - Probability (1)
    - Solid Geometry (2)
    - Fractions (3)
    - Integers and Graphs (1)
    - Measurement (2)

- Units some teachers deemphasize:
    - Geometry (8)
    - Number Theory (1)
    - Integers (1)
    - Metrics (1)
    - Measurement (3)
    - Fractions (1)

- Units some teachers reorder include:
    - Chapters 5 and 11 done together (1)
    - Geometry (6)
    - Measurement (1)

- Some units need supplementary materials either because they are poorly taught in the curriculum or because they do not give students enough practice. A few units need to be updated or need manipulative materials.

- Intermediate teachers tend to see the basic math text materials as well as the supplementary math materials as appropriate.

- The most common method for determining at the beginning of the school year, where a student should start is by starting at the beginning of the text or series, usually along with some other method such as a formal or informal test or previous placement.

- The math series in use, Holt, Rinehardt and Winston does not contain a math placement test.

- While one intermediate teacher tests daily, the remainder test twice a week or less for mastery of math skills.

- Most intermediate teachers use a combination of a teacher-made test and their own informal judgement in assessing mastery.

- Results of the teacher-made tests are used by most intermediate teachers for grading, for assessing mastery, for diagnosis or placement, and for assigning specific materials to students.

- Teachers differ in the method each uses to record student mastery in math:

Method	# of Teachers
Teacher grade books	7
Formal or informal teacher conferences	6
Folders of student work	6
School/district skills checklists or profiles	1
None	1

- Generally, intermediate teachers find such records usually accurate but not usually helpful.

- If a student does not pass a test, teachers tend to continue instruction and to use a procedure provided by the curriculum including repeating the materials covered, giving special work, tutoring the student, or giving extra homework.

- Within intermediate classes, most assignments are the same; a few are individualized. One teacher reported that in the given class most of the assignments are individualized.

- The majority of intermediate teachers decide what unit or chapter to work on next by following the sequence of the math test or series usually in conjunction with some other method.
- 2/3 of the intermediate teachers are somewhat familiar with the math program used in other grades. 1/3 are mostly unfamiliar.

ADMINISTRATOR QUESTIONNAIRE: STRUCTURE

- Results of the standardized tests are used to diagnose areas of student strength and weakness.
- Student math achievement is recorded or reported through formal or informal teacher conferences, folders of student work, and test results so that such information can be used by teachers from one grade to the next.
- In planning for their daily math classes, teachers follow a teacher's manual for the math text and the teacher's own plan.

INSTRUCTIONAL EVENTS

"This construct concerns the content, frequency, quality, and duration of instructional interactions. It is different from structure in that it refers primarily to an interpersonal contact, either between a student and a teacher or among students." (Cooley and Leinhardt, 1975, p. 6). There are two main aspects to this construct. The first is referred to as "instructional interactions" and deals with the interpersonal nature of instruction. More specifically, it deals with such things as teacher questioning and feedback techniques, and the frequency, quality and content of all interactions. The second aspect of this construct deals with the management of instruction in the classroom and is referred to as "classroom management."

INSTRUCTIONAL EVENTS

1. Supervision of student work in groups correlates positively with achievement (Soar, 1973). Similar results have been obtained for seatwork. Achievement is lower in classes which display the largest amounts of unsupervised seatwork (Coker, Lorentz, and Coker, 1976; McDonald and Elias, 1976; Soar, 1973, Stallings and Kaskowitz, 1974). This may result from the fact that unsupervised students are less academically engaged with their tasks (McDonald and Elias, 1976; Stallings and Kaskowitz, 1974).
2. Teacher initiated contacts during seatwork are negatively correlated with achievement gain, whereas student initiated contacts are positively correlated with achievement (Brophy and Evertson, 1974; Good and Grouws, 1975).
3. Teachers who play the role of strong leaders in their classrooms, i.e., direct activities without giving their students choices, approach the subject matter in a direct, business-like way, organize learning around questions they, and occupy the center of attention, are more successful in achieving student gains (Soar, 1973; Solomon and Kendall, 1976; Stallings and Kaskowitz, 1974). Student free choice, student limited choice, and free work groups relate to lower achievement (Soar, 1973). Allowing students to select seating, work groupings, and their own activities correlates negatively with achievement (Stallings and Kaskowitz, 1974). Soar (1977) suggests that an intermediate position with respect to teacher control is associated with the greatest pupil gains.

4. Teachers of classrooms showing high achievement gains devote less time to management than teachers of low achieving classrooms. In addition, more effective teachers use lesser amounts of criticism to control their classrooms and instead depend on a much more varied set of managerial techniques (Brophy and Evertson, 1974; Coker, Lorentz and Coker, 1976; Harris and Serwer, 1966).
5. Effective teacher of low SES pupils ask more lower order questions than ineffective teachers. Also, effective teachers of low SES pupils elaborate or discuss pupil answers less often than ineffective teachers. Effective teachers are more likely to acknowledge a pupil response or to quickly provide feedback and then continue with the main task. Above results from: Brophy and Evertson, 1974; Coker, Lorentz and Coker, 1976; Perham, 1973; Soar, 1973, Stallings and Kaskowitz, 1974.
6. Pupil responses to direct academic questions produce significant and positive correlations with achievement, whereas, pupil responses to non-academic questions and to open-ended questions correlate negatively with achievement (Stallings and Kaskowitz, 1974). Low SES students should be asked questions near their ability level to increase the likelihood of a correct response (Brophy and Evertson, 1974).
7. Effective teachers use more praise and positive motivation in their interactions with students (Brophy and Evertson, 1974; Harris and Serwer, 1966; Stallings and Kaskowitz, 1974). Stallings and Kaskowitz (1974) found that both teacher praise and criticism are positively correlated with achievement when focused on academic activities.

8. High SES students learn better in classrooms in which there is slight negative affect, whereas low SES students perform less well in this type of environment (Soar, 1977).
9. There is less deviant and disruptive behavior in the classes of effective teachers (Brophy and Evertson, 1974; Coker, Lorentz and Coker, 1976; McDonald and Elias, 1976; Soar, 1973).

TEACHER QUESTIONNAIRE RESULTS: INSTRUCTIONAL EVENTS

Kindergarten (K) and Transitional (T) Classes

- One teacher works on math less than once a week outside of math class; two teachers do this 1-2 times a week.
- The teachers vary in use of manipulatives to demonstrate a lesson. The results were: one teacher uses manipulatives less than once a week; one teacher uses them 1-2 times a week; one teacher uses them 5 or more times a week.
- One teacher has the students use manipulatives less than once a week; two teachers have students use them 5 or more times a week.
- All of the teachers spend the majority of the total math instruction time with the entire class. The range is from 50 percent - 100 percent. One teacher devotes 10 percent of total instruction to small groups; another gives 40 percent to small groups. Two of the teachers devote 10 percent of the total instruction to individual students.
- One teacher works with 10 students on an individual basis during a typical day; two other teachers work with 2 students each.
- Disruptive behaviors are only a minor problem for one teacher and no problem for two other teachers.
- Two teachers report that disruptive student activities interfere with math instruction less than once per class. One teacher has interference 3 or 4 times per class.
- one teacher has an aide during math class and that is only 1 or 2 times per week.
- The role of the aide is primarily to help students who are having problems.

Primary Classes

- One teacher never works on math skills outside of math class; six teachers do outside math work 1 or 2 times per week; 3 teachers do this about 3 or 4 times per week.
- Seven teachers use manipulatives to demonstrate a lesson 3 or 4 times per week; three teachers use them one or two times per week; one teacher uses them less than once per week.
- Five teachers have students use manipulatives 3 or 4 times per week; four teachers do this only once or twice per week; two teachers do this less than once per week.
- Five teachers spent 80 percent of total math instruction time with the entire class; three teachers spent 70 percent - 75 percent with entire class; one teacher spent 20 percent with entire group.

- Two teachers spent 20 percent of total instruction time with small groups; other teachers who worked with small groups looked like this: one teacher - 15 percent; one teacher - 10 percent; one teacher - 5 percent.

- Teachers worked with individual students as follows:

# Teachers	Percent of Total Instruction
1	50%
1	35%
1	25%
3	20%
1	15%
2	10%
1	5%

- Teachers work with students on an individual basis during a typical day.

# of Teachers	# of Students
3	3 each
3	4 each
1	6
1	8
2	10 each

(One teacher just indicated many.)

- Two teachers stated there is no problem with disruptive behavior when teaching math; eight teachers indicated a minor problem; one teacher mentioned a major problem.

- Four teachers stated that disruptive student activities interfere with math instruction less than once per class; five teachers said one or two times per class; two teachers said 3 or 4 times per class.

- Seven teachers never use aides during math class; three teachers use aides less than once during the week; one teacher uses an aide five or more times per week.

- All teachers who use aides in math do so mainly to help students practice basic facts.

Intermediate Grades

- Two teachers work on math skills with students outside of math class 3 or 4 times per week; five teachers do this one or two times per week; one teacher does this less than once per week.

- Two teachers use manipulatives in the lesson three or four times per week; two teachers use them once or twice per week; three teachers use them less than once; one teacher never uses them.

- One teacher has students use manipulatives 3-4 times per week; one teacher does this once or twice per week; three teachers do this less than once per week; one teacher never does this.

- The majority of the teachers spend most of the instructional time with the entire class. Here is the breakdown:

Students	# of Teachers	% of Total Instruction Time
Entire class	2	90% each
	1	85%
	1	75%
	1	65%
	1	60%
	1	50%
	2	0%
Small Groups	1	90%
	1	80%
	3	20% each
	2	5% each
	1	2%
	1	0%
Individual Students	1	30%
	3	20% each
	1	15%
	3	10% each
	1	8%

- Seven teachers work with from one to six students on an individual basis in math; one teacher works with 10 individually; one teacher works with 15-20 individually.

- Three teachers have no problems with disruptive behavior when teaching math; five teachers have a minor problem; one had a major problem.

- Five teachers cited that disruptive student activities interfere with instruction one or two times per class; four teachers said less than once per class; one teacher said 5 or more per class.

- Eight teachers never use aides during math class; one teacher has an aide less than once per week.

- The aide is used to lead small group lessons in practicing basic facts.

TEACHER PERCEPTIONS AND INSTRUCTIONAL INTEGRATION

These two variables are not part of the Cooley-Lohnes model, but have been added by the PSIP team in order to obtain more relevant information. Teacher perceptions refers to the way teachers and other school staff members view the instructional process, environment, and philosophy of their school. Instructional integration refers to the degree to which instruction among grades and from year to year is integrated.

Teacher Perceptions

I. The following chart indicates teachers feelings on the usefulness of in-service programs.

Topic	Grade Level	Not Useful	Useful	Very Useful
A. Use and interp. of stand. tests	K & T	2	1	
	Primary	5	6	
	Intermediate	5	3	1
B. Diagnosis	K & T		2	1
	Primary	1	9	1
	Intermediate	3	2	4
C. Remediation	K & T		1	2
	Primary		8	3
	Intermediate	3	3	3
D. Integrate & Use Suppl. material	K & T		1	2
	Primary	2	6	3
	Intermediate	1	5	2
E. Use & management of manipulatives	K & T		2	1
	Primary	1	8	2
	Intermediate	1	4	3
F. How to manage small group inst.	K & T		2	
	Primary	2	5	4
	Intermediate	2	3	3
G. How to individualize inst.	K & T			2
	Primary	1	4	6
	Intermediate	1	2	5
H. Content review of material & org. of series	K & T		2	
	Primary	4	7	
	Intermediate	6	2	
I. Teaching applications of math skills	K & T		1	1
	Primary	2	9	
	Intermediate	5	4	1
J. Teaching metric	K & T		2	
	Primary	5	7	
	Intermediate		5	3
K. Classroom use of hand-held calculator	K & T	1	1	
	Primary	6	5	
	Intermediate	5	3	1

II. In response to amount of training for teaching math:

A. All kindergarten and transitional teachers felt very well trained.
B. Eight primary teachers felt fairly well trained; two primary teachers felt very well trained; one primary teacher felt somewhat poorly trained.
C. Among the intermediate teachers, two felt extremely well trained; four felt very well trained; three felt fairly well trained.

Administrator Perceptions

I. Only one administrator completed the questionnaire. Here are the results of the usefulness of in-service programs.

Topic	Not Useful	Useful	Very Useful
A. Use and interp. of stand. tests		X	
B. Diagnosis			X
C. Remediation			X
D. Integrate & use suppl. materials		X	
E. Use & management of manipulatives			X
F. How to manage small group instr.			X
G. How to individualize instruction		X	
H. Content review of material & organiz. of series		X	
I. Teaching applic. of math skills			X
J. Teaching metric	X		
K. Classroom use of hand-held calculator	X		

II. The administration feels the teachers are fairly well prepared in the use of materials and techniques for the teaching of math.

CLASSROOM OBSERVATIONS

Classes of all teachers K-6 were observed with the exception of one primary class. One observation of approximately 45 minutes - 1 hour was made for each teacher or class. Each observation period was divided into three observation units of approximately 15 minutes each. The fifth grade mathematics teacher was observed twice (6 observation units), each time by a different observer and with a different class.

Class Size (Observed)

Grade Level	Number of Classes	Average Class Size
K	2 classes of 20 & 23	21.5
T	1 class of 14	14
1	3 classes of 20, 22, 24	22
2	3 classes of 18, 19, 20 (1 absentee teacher - class not observed)	19
3	4 classes of 21, 22, 23, 24	22.5
4	4 classes of 22, 23, 23, 24	23
5	3 classes of 22, 24, 25	23.6
6	4 classes of 22, 23, 23, 24	23

Average class size for total school 21

Average class size, excluding transitional 22

GROUPING

	Kindergarten + Transitional		Primary		Intermediate		Total School		
	#Teachers (N=3)	#Obs. Units	#Teachers (N=10)	#Obs. Units	#Teachers (N=9)	#Obs. Units	#Teachers (N=22)	#Obs. Units	
Teacher Directed-Individual	0	0	2	2	1	1	3	3	Teacher Directed-Individual
Teacher Directed-Small Group	0	0	1	2	2	4	3	6	Teacher Directed-Small Group
Teacher Directed-Total Group	3	7	10	21	6	18	19	46	Teacher Directed-Total Group
Teacher Supervised Independent Work	2	2	8	12	5	10	15	24	Teacher Supervised Independent Work
Non-Supervised Independent Work	1	1	5	9	5	7	11	17	Non-Supervised Independent Work
Non-Supervised Small Group Work	0	0	1	1	0	0	1	1	Non-Supervised Small Group Work

STIMULUS MODE

	Kindergarten + Transitional		Primary		Intermediate		Total School		
	#Teachers (N=3)	#Obs. Units	#Teachers (N=10)	#Obs. Units	#Teachers (N=9)	#Obs. Units	#Teachers (N=22)	#Obs. Units	
Listen	3	6	8	16	7	20	18	42	Listen
Watch/See	3	7	10	21	9	24	22	52	Watch/See
Touch/Manipulate	3	8	7	13	2	7	12	28	Touch/Manipulate
Read/Look at Pictures	2	5	8	15	2	4	12	24	Read/Look at Pictures
Write	0	0	2	2	2	4	4	6	Write
Peer Tutoring	0	0	1	1	0	0	1	1	Peer Tutoring
Games on Chalkboard	0	0	0	0	1	1	1	1	Games on Chalkboard
Games in Small Groups	0	0	1	1	0	0	1	1	Games in Small Group

RESPON. MODE

	Kindergarten + Transitional		Primary		Intermediate		Total School		
	#Teachers (N=3)	#Obs. Units	#Teachers (N=10)	#Obs. Units	#Teachers (N=9)	#Obs. Units	#Teachers (N=22)	#Obs. Units	
Oral	3	5	10	19	5	15	18	39	Oral
Written	2	3	9	21	10	24	21	38	Written
Manipulative	3	6	6	8	1	2	10	16	Manipulative
Physical/Movement	2	4	4	6	3	6	9	16	Physical/Movement
Peer Tutoring	0	0	1	1	0	0	1	1	Peer Tutoring
Games	0	0	1	1	0	0	1	1	Games

MATERIALS

	Kindergarten + Transitional		Primary		Intermediate		Total School		
	#Teachers (N=3)	#Obs. Units	#Teachers (N=10)	#Obs. Units	#Teachers (N=9)	#Obs. Units	#Teachers (N=22)	#Obs. Units	
Teacher Made	2	7	6	12	3	8	11	27	Teacher Made
Pupil Made	0	0	1	1	3	6	4	7	Pupil Made
Text	0	0	2	4	3	6	6	10	Text
Workbook	0	0	4	7	0	0	4	7	Workbook
Dittoes	3	3	5	6	2	4	7	10	Dittoes
Other	3	3	12	14	1	1	13	15	Other
	.Numbers for feltboard .Rabbits eggs .Number cards		.Clocks .Puzzles .Felt numbers .Flashcards	.Games .Parquetry		.Notes			

A-V EQUIPMENT

	Kindergarten + Transitional		Primary		Intermediate		Total School		
	#Teachers (N=3)	#Obs. Units	#Teachers (N=10)	#Obs. Units	#Teachers (N=9)	#Obs. Units	#Teachers (N=22)	#Obs. Units	
Projectors	0	0	0	0	0	0	0	0	Projectors
Players/Recorders	0	0	0	0	0	0	0	0	Players/Recorders
Flannelboard	1	1	2	4	0	0	3	5	Flannelboard
Chalkboard	1	1	4	6	3	11	11	17	Chalkboard
Paper and Pencil	---	---	---	---	4 *	7 *	4 *	7 *	Paper and Pencil

* Significant use in lesson presentation

Mathematics Bulletin Boards And Displays

Mathematics bulletin boards and displays were evident in all kindergarten, transitional, and primary classes and included the following kinds of items:

- Calendars (6)
- Numbers (8): on wall, hanging from ceiling, Number Train, Inchworm, Number Line, a poster, number cards, flowerpots, mobile
- Manipulatives (many in transitional)
- Clocks (2)
- Pocket Chart (decades)
- Count by Tens Game
- Toss and Total Game
- Math Fun Folders
- "Math to Do" - center with games & activities
- Posters: Ordinal Numbers
  Days of Week & Months of Year
- Bulletin Board - "How Many Can You Pop?" (+ & - facts)
- Bulletin Board - "Take a Multiplication Hike"
- Timetables (2)
- Charts - measurement
- "How much is your name worth?"
- Flashcards
- Bulletin Boards: money; multiplication; growth
- Metric Chart

Mathematics bulletin boards and displays were evident in six of the nine intermediate classes. No mathematics displays were evident in three of the nine. Those observed included:

- Number chart
- Calendar
- Bulletin board: pictures of mathematics and student bibliographical reports
- Bulletin boards:

  Freaky Fractions
  Metric vs. English
  Decimal Numerals
  Metric Facts
  Our Best Math
  Origins of Numbers
  Names of Students who know multiplication facts

- Three dimensional geometry display
- One small chart with measured units taped to bulletin board
- One measurement chart and basket for math work
- Scoreboard and math homework memos

Observer's Comments

Kindergarten and Transitional

- "Attractive room"
- "Attractice room"
- "The teacher has had to make all her own math materials. There isn't a commercial workbook available matching the ability of these students."

Primary

- Class was very attentive for its being so late in the day.
- The room had a lot in it--lots of stimuli--maybe too much.
- Attractive room.
- The actual group lesson was 24 minutes. Follow-up and independent work with feedback about 20 more minutes. At this point, all students were working on games.
- Traditional rows of students.
- The room was arranged in a U-shape so that the children had no obstacles or other students to block their view of the teacher and the blackboard.

Intermediate

- The room was arranged in a U-shape so that everyone was able to see what was going on. Several boys were separated from the rest of the class--sat near the teacher's desk.
- Teacher made a point of explaining the bulletin board.
- This teacher has a good rapport with the students. The students were well behaved--even lining up for and walking to music class.
- Traditional rows.
- Lots of non-math bulletin boards and an attractively arranged room.
- Small groups work very effectively for this teacher in terms of students' attention to and participation in lesson. More than half of the students are very productive during the time spent in unsupervised independent work. Perhaps something could be done to encorage the remainder to work more steadily.
- This room was arranged in a U-shape and attractively decorated for the season. The group was very much attentive throughout most of the observation period.

Time Variable

During observation periods, the observers tallied student behaviors in an effort to determine the extent to which students attended to teacher-directed instruction, actively participated in the lesson by volunteering answers or in some other manner, and maintained and/or completed assigned tasks during the working period.

Observers also recorded the content of teacher talk by category in an effort to determine the amount of time teachers spend on actual instruction, on instructional management, and on classroom management.

Kindergarten and Transitional

Attention

88% of students were observed to be attentive throughout the observation period.

Observable instances of inattention were recorded for 12% of the students.

The percentage of the instructional period any one student was observed to be inattentive was .5% or less.

Active Participation

100% of the students in classes observed actively participated at some point during the class.

During only one of six observation periods were 50% of the students not actively participating. During the other five observation periods, 100% of the students actively participated.

The opportunity for active participation ranged from 1%-100% of the observation period: an average of 60% of the time students had an opportunity for active participation.

The active participation observed was of the following nature:

. The student answered a question by specific request of the teacher	40%
. The student volunteered an answer when a question was asked of the group (or answered with the group)	38%
. The student initiated a question or comment	6%
. The student participated in some other way such as using a flannel board	17%

Task Maintenance/Completion

In two classes, 100% of the students maintained and completed assigned tasks during a five to ten minute work period.

In the third class, most of the students completed the assignment with help during a ten minute period. Three students failed to maintain the task by talking aloud, looking around the room and disturbing each others' work.

Teacher Time

Teachers spent 20% or less of the observed time on management.

A range of 30% to 70% and an average of 47% of the time was spent on direct instruction with the remainder of the time spent directing student participation.

Primary Grades

Attention

There were no significant observable instances of inattention for 71% of the students.

Observable instances of inattention ranged from 0-50% in any one class and averaged 29% of all students.

The percentage of the instructional period that any one student was inattentive ranged from a negligible amount of time to 50% with an average of 12%.

Active Participation

85% of the students in primary classes observed actively participated at some point during the observation periods. The percentage of students in any one class observed to actively participate ranged from 60%-100%. 15% of the students were observed to be not actively participating.

The opportunity for active participation ranged from 11% to 99% of the observation time in each class with an average of 56% of the observation time as opportunity for students' active participation.

The active participation observed was of the following nature:

. The student answered a question by specific request of the teacher	20%
. The student volunteered an answer when a question was asked of the group (or answered with the group)	38%
. The student initiated a question or comment	4%

- The student participated in some other way such as working at the chalkboard, doing problems on paper, performing some physical activity, tossing at a target, playing a game, manipulating a simulated clock, solving a problem in the workbook, using counters, or reading problems from the textbook 38%

Task Maintenance/Completion

The percentage of students maintaining and/or completing independent assignments during any one class ranged from 37% to 100%, with the average percent of students maintaining and completing tasks being 72%.

Conversely, the percentage of students failing to maintain independent assignments during the work period ranged from 11%-63% in any one class with the average being 28%.

In a number of the classes where task maintenance was low, the teacher sat at his/her desk and attempted to correct individual students' work. Independent work was unsupervised and the students tended to fool around even if the work did not present any difficulty.

Classes where maintenance was high tended to be highly organized and more closely supervised during independent work time. There was evidence that aspects of classroom management had been thoroughly planned and that students had learned to adhere to a familiar routine.

Teacher Time

Time spent on classroom management ranged from a negligible amount to 10% of the observation period, with the average being 3%.

Time spent on instructional management ranged from a negligible amount to 20% of the observation period, with the average being 5%.

A range of 10-95% and an average of 46% of time was spent on direct instruction with the remainder of the time spent directing student participation.

Intermediate Grades

Attention

There were no significant observable instances of inattention for 79% of the intermediate students. Observable instances of inattention were recorded for 21% of students.

In 50% of the intermediate classes, only negligible instances of inattention were recorded by observers. In the remainder of the classes, inattention was noted on the part of 25%-50% of students in each class. In most cases, inattention on the part of these students was 4%-8% of the observation period.

Somewhat isolated exceptions to this pattern were noted:

- In one class, 1/4 of the students failed to attend throughout 17% of the period.
- One child in one class failed to attend for 32% of the period.
- In two classes, 17%-25% of the students missed approximately 25% of the instruction by coming to class late or forgetting homework.
- In one class, the entire class lost 5% of the instructional period when the teacher stopped to help one student who was having difficulty.

Active Participation

According to observations recorded, 79% of students in classes observed actively participated in the lesson, 21% did not. In 50% of intermediate classes, 100% of the students actively participated. In the remainder of the intermediate classes there was a range of 41%-80% of students actively participating.

Classes with 100% active participation were the same classes having very low rates of inattention.

The opportunity for active participation ranged from 17%-80% of the observation period with an average of 47% for all intermediate classes.

The active participation observed was of the following nature:

. The student answered a question by specific request of the teacher	33%
. The student volunteered an answer when a question was asked of the group (or answered with group)	23%
. The student initiated a question or comment	7%
. The student solved a problem at the chalkboard	7%
. The student solved a problem on paper	25%
. The student checked his homework	25%
. Other	1%

Task Maintenance/Completion

In three intermediate classes, no independent assignments were observed.

In the remainder of the classes, a range of 4%-100% of students maintained assignments throughout the entire work period, or completed the assignments with an average of 79% maintaining and/or completing assignments.

A range of 88% to 100% of students maintained assignments for 50% or better of the available time with an average of 95% maintaining task for at least 50% of the time.

0%-8% of students in any one class failed to maintain tasks at all with an average of 3% of students not maintaining tasks during the work time.

Teacher Time

Percentage of time spent on classroom management ranged from 0%-40% with an average of 10% of time spent on classroom management.

Percentage of time spent on instructional management ranged from 4% to 55% with an average of 15% of time spent on instructional management.

A range of 5%-66% of the time was spent on direct instruction with an average time spent of 52%. The remainder of the time was spent directing student participation or conducting reinforcement/review activities.